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ABSTRACT

A study was designed to determine if self-critique by videotapes of a practice session was as effective for teaching a nursing skill as were teacher critiques of the practice session. Seventy women nursing students were trichotomized by anxiety level and randomly assigned to either the self-critique with a procedure checklist treatment or to the teacher critique treatment. All subjects first viewed a teaching tape of the skill, participated in a practice session with one of the two critique treatments, and then completed two post critique performances of the procedure. Results of analyses indicated that the self-critique and teacher critique methods produced the same learning levels, with anxiety level of students having no significant effects. The major recommendation for future research is for investigation to determine if students learn similar procedures with less stress and anxiety when sequencing and patterning are first learned with models than if they are first learned with real patients. (Author/SH)

Final Report

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U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
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P R E F A C E

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Tables and figures were drafted by Donald G. Harrison.

A B S T R A C T

This study attempted to determine if self-critique by videotapes of a practice performance was as effective for teaching a nursing skill as was teacher critique of students' practice. Students were trichotomized by anxiety level and randomly assigned to teaching method to detect effect of anxiety level.

The experimental treatment consisted of teaching a nursing skill (changing a sterile dressing) to the subject population, providing for one practice and for the two kinds of critique conditions. Experimental critique was a self-critique of a videotape of the first practice using a procedure checklist. Control critique was provided verbally by graduate students (nurses) following the first practice using the same checklist.

A 2 x 3 x 2 level design was used with nesting of the anxiety factor under locations. Analysis of covariance using Scholastic Aptitude Test (SAT) Scores and ranking on the basis of past experience with nursing procedures was used to treat data.

The subject population consisted of women students from two State University Schools of Nursing. Data on 70 subjects were available for analysis.

Results indicated self-critique results in the same learning level as teacher critique. Anxiety level of students had no significant effect. The major recommendation for future research was for investigation to determine if students learn similar procedures with less stress or anxiety when sequencing and patterning are first learned with models than if they are first learned with real patients.

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INTRODUCTION

Nursing faculties have worked to discover and utilize the most effective methods for teaching the very large number of psychomotor skills which nursing students must learn. Traditionally, these skills have been demonstrated to students and students have practiced, usually in a laboratory, under the watchful eyes of classmates and teacher. A final series of criterion performances in the clinical setting has usually been considered essential since many nursing faculty members perceive their role as one of certification as well as instruction.[1]

Innovations in this pattern such as the use of audio-visual materials for demonstrations and the use of 8mm filmloops by individual students have become more widespread in recent years. A recent publication[2] which provides a listing of grants awarded from 1965 to 1971 for improvement in nursing training gives eloquent testimony to the development and expansion of the use of multi-media approaches for the teaching of nursing. Sixty-nine of the grants listed were in the area of Instructional Technology. Descriptions of individual grants revealed that they included primarily (1) the development of independent study laboratories that allow students to view films, filmstrips, slides, charts and videotapes and (2) the development and production of films and videotapes by faculty. Some grants included the development of programmed instruction and computer assisted learning.

Partially as a result of such support, television systems have been installed in many schools of nursing. These nursing programs have the capacity to use multi-media to demonstrate a variety of perceptual-motor skills and access to video-trainers can also provide rapid visual feedback to students practicing the manual skills of nursing. The more traditional method of supervisory critique can utilize this type of visual feedback. Self-critique, or evaluating one's own performance by means of viewing a videotape is another method which can be employed. In an attempt to use these available systems to improve and individualize instruction, the idea of self-critique via videotapes in place of supervisory critiques by the instructor seemed worthy of investigation.

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[1]Christopher Jenks and David Riesman, "The Professional Schools," *The Academic Revolution* (Garden City, N.Y.: Doubleday and Company, Inc., 1968), Chapter V. This provides a discussion of the themes (1) that professional schools act to screen potencial practitioners and (2) that American education functions to certify its graduates to society as well as to teach them. Under such system, employers or users of a service presume competence in those persons who have graduated from a school and nursing faculty generally feel a moral responsibility for this certification.

[2]*Special Project Grants Awarded for Improvement in Nurse Training, A Listing* (Bethesda, Maryland: U.S. Department of Health, Education and Welfare, Public Health Service, National Institutes of Health, Bureau of Health Manpower Education, Division of Nursing) pp. 1-96, July, 1971.

In considering the effects of self-critique versus the effect of instructor critique the hypothesis was formulated that individual students might profit differently from the two methods of critique. Teachers have noted that some students become extremely awkward when they practice a nursing skill with the instructor observing for purposes of critique. These students have indicated that being observed is stressful for them and that they could improve their performance if they were not observed. Other students did not experience the problem of decrement in performance as a result of instructor observation.

PROBLEM

Statement of the Problem

The problem of this study was to determine if the corrective feedback provided by showing videotapes of their practice performance to students was as effective in teaching a complex nursing skill as was the corrective feedback provided by a verbal critique done by a nursing instructor. The primary purpose of the study was the experimental testing of these two methods of critique. In addition, the study was designed to test hypotheses regarding the effect of anxiety associated with teacher critique on the performance by the student. The research hypotheses which guided the design and execution of this study were stated as follows:

1. In a comparison of all subjects experiencing self-critique by videotape with all subjects experiencing teacher critique, there will be no significant difference in learning.

2. Of subjects having high anxiety, those experiencing self-critique by videotape will perform significantly better than those experiencing teacher critique.

3. Of subjects having low anxiety, those experiencing teacher critique will perform significantly better than those experiencing self-critique by videotape.

The research hypotheses regarding differential performance related to levels of anxiety were developed within the context of Hull-Taylor-Spence theories[3] on Drive. A concise statement of the theory is as follows. In a given situation, performance of complex activities will deteriorate as anxiety increases because many competing responses will be elicited.[4] Anxiety as measured by the Manifest Anxiety Scale

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[3]Clark L. Hull, *Essentials of Behavior* (New Haven: Yale University Press, 1951), C.L. Hull, *Principles of Behavior* (New York: Appleton-Century-Crofts, 1943), Janet A. Taylor, "Drive Theory and Manifest Anxiety," *Psychological Bulletin*, 53:303-320, July, 1956.

[4]*Ibid.*

(designated hereafter as M.A.S.) is one acceptable specification of Drive in Hull's theory. If this is the case, persons with high levels of anxiety would perform a task better in the critique situation in which the least additional stress was produced.

The assumption was made that self-critique was less stressful than teacher critique.[5] [6] [7] Interaction between drive level and method of critique was anticipated so that when students were stratified according to scores on the M.A.S. (as a measure of anxiety) self-critique was expected to promote better performance for high anxious subjects and teacher critique to promote better performance for low anxious subjects.

If, as hypothesized, there was an interaction between drive level and method of critique, it would be possible to identify students whose performance was improved by a specific method. Faculty would then be able to individualize instruction for more effective learning.

Importance of the Study

The critical need for the development of self-instruction in nursing programs and the necessity for using technology to expand the capabilities of faculty is noted by Lysaught. He points out that: "There are a growing number of small studies that attest to the effectiveness and efficiency of self learning techniques."[8]

de Tornyay discusses the value as well as the necessity for these innovative strategies. She says:

Videotape allows the student to see himself as others see him, and it provides a powerful tool . . . . Indeed, it is

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[5]Early reports on the development of micro-teaching techniques in Jimmie C. Fortune, "The Stanford Summer Micro-Teaching Clinic, 1965," *Journal of Teacher Education* (Winter, 1967), pp. 389-393, indicate informal observations leading to the belief that self-critique without a supervisor is less anxiety provoking.

[6]In "Minicourse: Theory and Strategy," (*Educational Technology*, 9:57, September, 1969), Phillip Langer says, "It must be emphasized that the self-feedback provided by these forms" (he refers to checklists for self-evaluation in teach, re-teach sessions) "is not accompanied by the emotional behavior generated by a supervisor."

[7]A.K. Roe, "The Use of Learning Experiences (LEG) in the Associate Degree Nursing Program" (mimeo), Fort Lauderdale, Fla.: Junior College of Broward County, 1968. As cited by Jerome P. Lysaught, "Self-Instruction in Nursing Education: The Impact of Technology on Professional Curricula," *Educational Technology*, 9:23, July, 1969.

[8]Jerome Lysaught in "Self-Instruction in Nursing Education: The Impact of Technology on Professional Curricula," *Educational Technology*, 9:24, July, 1969.

predicted that the videotape recorder will be utilized as frequently as the audiotape recorder is used in schools of nursing.[9]

The use of television in medical centers and hospitals as well as in schools of nursing is still developing. Empirical evidence which would guide the utilization of faculty and judicious use of equipment is appropriate. This conclusion was supported editorially in *Nursing Research:*

We might all agree that television can be a means of making more effective use of the teachers we have, and of the importance of this in view of the present shortage of qualified teachers. However, we need more research . . . if we are to make the best of television.[10]

Gage's critical comments are pertinent in judging the importance of a study such as this. He indicates that most of the research done on teacher effectiveness concentrated on such gross divisions of behavior that little is learned from the research.[11] One example of such an evaluative study would be the comparison of lecture method versus discussion method conducted over semester periods.

Cronbach has spoken in favor of research which can help identify specific instructional methods most effective for given kinds of students.[12] Despite the fact that others such as Bracht and Glass[13] question the possibility of eliciting evidence of interaction of personological variables and treatment in complex situations, it is worthwhile to continue to gather evidence for or against such interactions until a more definitive position can be established.

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[9]Rheba de Tornyay, "Instructional Technology and Nursing Education," *The Journal of Nursing Education,* 9:7, April, 1970.

[10]Editorial, "TV Research," *Nursing Research,* 13:195, Summer, 1964.

[11]Nathaniel L. Gage, "An Analytical Approach to Research on Instructional Methods," *The Journal of Experimental Education,* 37:118-125, Fall, 1968.

[12]Lee J. Cronbach, "How Can Instruction be Adapted to Individual Differences?," *Learning and Individual Differences,* R.N. Gagne, Ed., (Columbus, Ohio: Charles E. Merrill, 1967), Ch. 2, pp. 23-39.

[13]Glenn H. Bracht and Gene V. Glass, "The External Validity of Experiments," *American Educational Research Journal,* 5:444-452, November, 1968.

BACKGROUND LITERATURE

Literature on Anxiety

This research was guided by the theoretical formulations of the Hull-Spence-Taylor theory of Drive (specified as anxiety). In addition, the Yerkes-Dodson principle was accepted; this principle states that there is an optimum level for drive and once it is reached, further increases in drive result in deterioration of performance.[14]

Over 60 years ago, Yerkes and Dodson, using dancer mice, tested the rapidity with which the mice could learn to discriminate between alternative routes to their next box under three (very easy, moderate and very difficult) conditions for making the discrimination and at several levels of aversive stimuli (three degrees of electric shock) administered for incorrect choice. Under conditions in which it was very easy or moderately easy to make the necessary discrimination between correct routes to take to the nest box, the mice learned most rapidly with the moderate electric shock; the rate of learning was slow for both very weak and very strong electric shock.[15]

Approximately three decades later, Hull elaborated an extensive set of postulates relating such factors as drive (or motivation) and performance in learning situations.[16] Spence and Taylor have carried out extensive research testing Hull's theory and utilizing anxiety as the particular specification of drive in their research.

Taylor's article[17] is one of the major expository sources in the literature describing the Hullian concepts utilized in what is currently known as the Hull-Taylor-Spence theory of anxiety. This article also discusses the postulated relationship between drive level and scores on the M.A.S.

Essentially, the concept which Taylor, *et al.*, utilized were that habits (H) represented a stimulus-response connection of varying strength or weakness and that drive (D) was the sum of need states, primary or secondary. Taylor stated that ". . . all habits (H) activated in a given situation combine multiplicatively with the total

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[14]H.J. Eysenck, "The Measurement of Motivation," *Scientific American*, May, 1963, p. 130.

[15]Robert M. Yerkes and John S. Dodson, "The Relation of Strength of Stimulus to Rapidity of Habit Formation," *Journal of Comparative and Neurological Psychology*, 18:459-482, May, 1908.

[16]Clark Hull, *Principles of Behavior*, (New York: Appleton-Century-Crofts, Inc., 1943).

[17]Janet A. Taylor, "Drive Theory and Manifest Anxiety," *Psychological Bulletin*, 53:303-319, July, 1956.

effective drive state (D) operating at the moment to form excitatory potential E (E = f (H xD)."[18] Accordingly, "since response strength is determined in part by E, the implication of varying drive level in any situation in which a single habit is evoked is clear: the higher the drive, the greater the value of E and hence of response strength."[19] In situations where the behavior to be evoked involves a single habit tendency - ". . . the performance of high drive Ss should be greater than that for low-drive groups."[20]

Taylor also pointed out theoretical formulations for predicting behavior in more complex performance:

> *In situations in which a number of competing response tendencies are evoked, only one of which is correct, the relative performance of high and low drive groups will depend upon the number and comparative strengths of the various response tendencies.*[21]

Hull introduced the concept of oscillatory inhibition (O) and threshold (L). The O value varies from moment to moment; its value is to be subtracted from excitatory potential (E) yielding momentary excitatory potential (E). Momentary excitatory potential (E) must attain threshold value (L) to activate a response.

When a stimulus tends to evoke competing responses, the one with the highest (E) appears; that is, the response with the greatest habit strength (other things being equal) will have the greater probability of occurring. Taylor said:

> *When the correct response, is weaker (i.e., has less H) than one or more of the competing tendencies, the high-drive groups should be inferior in performance to low-drive Ss.*[22]

It is also possible that the correct response tendency may be strongest and lead to superior performance of high-drive subjects.[23] This situation *could* exist if the learner has past experience with the learning task.

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[18] *Ibid.*, p. 304.

[19] *Ibid.*

[20] *Ibid.*

[21] *Ibid.*

[22] *Ibid.*, p. 305.

[23] *Ibid.*

Performance in simple conditioning: Experimental evidence in classical condition situations[24] [25] [26] [27] (using eyelid response to puffs of air) supported the prediction that high-anxiety subjects require fewer trials for both development and extinction of noncompeting response than do low-anxiety subjects and that they react more emotionally to noxious or threatening situations. Subjects were selected on the basis of the Manifest Anxiety Scale; therefore, these experiments may be taken as evidence for the validity of the M.A.S. as a measurement of anxiety.

Performance in complex learning: Elevation of the drive level, however, does not necessarily increase the probability of a correct response in a situation in which a number of competing response tendencies may be called forth.[28]

> . . . *When the habit strength of the desired response is weaker than those of competing responses, raising the level of drive would be expected to have the . . . effect . . . (of) impairment of performance.*[29]

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[24]Kenneth W. Spence and I.E. Farber, "Conditioning and Extinction as a Function of Anxiety," *Journal of Experimental Psychology*, 45:116-119, February, 1953.

[25]K.W. Spence and Janet Taylor, "Anxiety and Strength of the U.C.S. as Determiners of the Amount of Eyelid Conditioning," *Journal of Experimental Psychology*, 42:183-188, September, 1951.

[26]Janet A. Taylor, "The Relationship of Anxiety to the Conditioned Eyelid Response," *Journal of Experimental Psychology*, 41:81-91, February, 1951.

[27]Kenneth W. Spence, I.E. Farber and Elaine Taylor, "The Relation of Electric Shock and Anxiety to Level of Performance in Eyelid Conditioning," *Journal of Experimental Psychology*, 48:405-408, November, 1954.

[28]Janet A. Taylor, "Drive Theory and Manifest Anxiety."

[29]Janet A. Taylor and Kenneth W. Spence, "The Relationship of Anxiety Level to Performance in Serial Learning," *Journal of Experimental Psychology*, 44:62, August, 1952.

Evidence from four additional studies involving learning tasks supported the formulation that low anxious subjects perform significantly better than high anxious subjects.[30] [31] [32] [33]

Drive and psychomotor learning: Wassenaar investigated the relationship of M.A.S. scores to performance by 15 subjects on seven motor tests by means of correlational analysis and factor analysis. From all the tests, four major factors were identified, of which Factor II was identified as representing the "detrimental effect of general anxiety upon performances in various psychomotor tasks"[34] and had ". . . a particularly high loading in the Manifest Anxiety Scale."[35] Wassenaar concluded that, "it can thus be expected that individual performance in various test situations, (psychomotor) and in everyday life, will be greatly affected by the presence of general anxiety."[36]

Interaction of anxiety and learning: Interaction of anxiety and level of learning task was demonstrated in early studies.[37] More recent research[38] has provided evidence continuing to support the Hull-Spence-Taylor theory of anxiety in learning.

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[30]E.K. Montague, "The Role of Anxiety in Serial Rote Learning," (unpublished Ph.D. dissertation, State University of Iowa, 1950), cited by Janet A. Taylor and Kenneth W. Spence, "The Relationship of Anxiety Level of Performance in Serial Learning," *Ibid.*, p. 62.

[31]J.A. Taylor and K.W. Spence, "The Relationship . . .," p. 63.

[32]I.E. Farber and Kenneth W. Spence, "Complex Learning and Conditioning as a Function of Anxiety," *Journal of Experimental Psychology*, 45:120-125, February, 1953.

[33]Charles K. Raymond, "Anxiety and Task as Determiners of Verbal Performance," *Journal of Experimental Psychology*, 46:120-124, August, 1953.

[34]G.M.C. Wassenaar, "The Effect of General Anxiety as an Index of Liability on the Performance of Various Psychomotor Tasks," *The Journal of General Psychology*, 71:354, 1964.

[35]*Ibid.*

[36]*Ibid.*, p. 356.

[37]K.W. Spence, John Taylor, Rhoda Ketchel, "Anxiety (Drive) Level and Degree of Competition in Paired-Associates Learning," *Journal of Experimental Psychology*, 52:306, 1956.

[38]Robert D. Tennyson and F. Ross Wooley, "Interaction of Anxiety with Performance on Two Levels of Task Difficulty," *Journal of Educational Psychology*, 62:463, December, 1971.

Research on Instruction

Individual differences in learning: There are two opinions regarding individual differences in learning. There are some theorists like Jensen,[39] who believe that a structure and an order in individual differences in learning does exist and can be found through appropriate research. On the other hand, some researchers regard the effect of individual differences in learning as "error variance" and in research design will take their effect into account only on this basis.

One of the most important considerations in regard to individual differences in learning, however, is the way in which these differences influence instruction. In his discussion of the ways in which adaptation to individual differences can be implemented, Cronbach presents a new theory of aptitude. He describes aptitude as:

> *a complex of personal characteristics that accounts for an individual's end state after a particular educational treatment, i.e., that determines what he learns, how much he learns, or how rapidly he learns.*[40]

He further suggests that research seeking evidence of interaction of treatment and personological variables might furnish empirical evidence for systematic adaptation of methods of instruction. The direction which should be pursued is that of development of an empirically based theory "whose propositions would state the conditions of instruction best for pupils of certain types, both conditions and types being described in terms of fairly broad dimensions."[41]

Mitchell points out that there is little research cited to support the above position "simply because there is little useful evidence of this type available."[42] In addition, he mentions that according to Bracht and Glass the small amount of existing evidence for personological variable by treatment interactions is not very convincing. While recognizing the value of the questions related to whether evidence of significant interactions justifies differential treatment of persons, Mitchell concluded that "clearly there is a challenging and rocky road ahead and no assurance that the destination will be reached or that the

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[39]Arthur R. Jensen, "Varieties of Individual Differences in Learning," *Learning and Individual Differences*, Robert M. Gagne, Ed., Columbus, Ohio: Charles E. Merrill Books, Inc., 1967, p. 117.

[40]Lee J. Cronbach, "How Can Instruction be Adapted to Individual Differences," *Learning and Individual Differences*, Robert M. Gagne, Ed., Columbus, Ohio: Charles E. Merrill Books, Inc., 1967, p. 23.

[41]*Ibid.*, p. 30.

[42]James V. Mitchell, "Education's Challenge to Psychology," *Review of Educational Research*, 39:700, December, 1969.

yield will justify the effort. But at this stage in the development of educational psychology, it is important that the effort be made . . ."[43]

Of even more direct application to this study were the comments of Hastings who said that the data necessary for decisions relative to curriculum revision and course content improvement innovations must be collected through instructional research rather than only by research oriented to learning.[44] This instructional research could be made up of actual curricular content and would probably occur in an ongoing classroom situation. Hastings identifies one type of investigation which would be helpful: "investigating the relative advantages - for individuals with varying characteristics - of different modes of studying the same materials."[45] He indicates this kind of research will assist in selection of materials and treatments to be most useful to particular students.

It was recognized that the literature contained conflicting views on the merits of attribute by treatment interactions; however, the experimental testing of the interaction was pursued.

Audio-visual instruction: A number of studies included by Lumsdaine[46] were pertinent to this research because they reported on the use of films to teach psychomotor or perceptual motor tasks. Of particular interest was the evidence that training films reduced individual differences in motor skills[47] - an effect also demonstrated by Vander Meer, 1945.[48] It was suggested that viewing the film reduced

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[43] *Ibid.*, p. 702.

[44] J. Thomas Hastings, "Curriculum Evaluation: The Why of the Outcome," *Current Research on Instruction*, Richard C. Anderson, Ed., Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1969, p. 380-384.

[45] *Ibid.*, p. 383.

[46] A.A. Lumsdaine (Ed.), *Student Response in Programmed Instruction*, Washington, D.C.: National Academy of Sciences - National Research Council, 1961.

[47] William J. McGuire, "Some Deleterious Effects on a Perceptual-Motor Skill Produced by an Instructional Film: Massing Effects, Interference and Anxiety," *Student Response in Programmed Instruction*, A.A. Lumsdaine, Ed., Washington, D.C.: National Academy of Sciences - National Research Council, 1961, p. 181.

[48] A.W. Vander Meer, "The Economy of Time in Industrial Training: An Experimental Study of the Use of Sound Film in the Training of Engine Lathe Operators," *Journal of Educational Psychology*, 36:65-90, January, 1945.

individualistic modes of performance.[49] This suggestion was significant because it indicated that detecting differences between the two treatment groups in this study might be affected by the use of the model teaching type.

The study reported by Sheffield, Margolis and Hoehn[50] indicated that a complex sequential task (64 assembly operations) could be learned to criterion by 90 percent of the subjects from viewing a film and after only two overt practices. While this successful performance by the subjects revealed that there might be difficulty in detecting differences between treatment groups, it also provided some information necessary to establish the level of complexity and number of sequential steps to be used in selecting the psychomotor task which was used in this experiment.

Margolis and Sheffield reported an experiment to determine the optimum number of units of a filmed sequence to be shown prior to practice periods. The film was to be used for teaching a complex assembly operation. The conclusion was reached that learning was best when the 18 minute demonstration of the task was broken down into four smaller units with practice after each.[51] In the present study the demonstration videotape was presented as a whole; however, the components of the teaching film (or videotape), practice period and terminal performance test are similar.

Utilization of television in nursing education: Published research on the use of television for teaching nursing is limited. In 1964, Griffin, Kinsinger and Pitman published the results of a study testing the use of closed circuit television (CCTV) in an effort to develop answers to the broad educational question, how can an instructor meet the needs for individualized instruction of an increased number of nursing students?[52] The experiment compared the teaching of clinical nursing by conventional methods and by using TV to monitor students in patient areas plus additional audio contact from teacher to student via earplugs. The findings were that resultant learning did not differ

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[49]McGuire, *op. cit.*, p. 181.

[50]Fred D. Sheffield, Garry J. Margolis and Arthur J. Hoehn, "Experiments on Perceptual Mediation in the Learning of Organizable Sequences," *Student Response in Programmed Instruction*, A.A. Lumsdaine, Ed., Washington, D.C.: National Academy of Sciences - National Research Council, 1961, pp. 196-220, as cited in Chapter II.

[51]Garry J. Margolis and Fred D. Sheffield, "Optimum Methods of Combining Practice with Filmed Demonstration in Teaching Complex Response Sequences," *Current Research on Instruction*, Richard C. Anderson, Ed., *op. cit.*, p. 281-286.

[52]Gerald J. Griffin, Robert E. Kinsinger, Avis J. Pitman, "Clinical Nursing Instruction and Closed Circuit TV," *Nursing Research*, 13:196, Summer, 1964.

between experimental and control students but that safety could be maintained and each instructor could supervise a minimum of five more students by using the CCTV.[53]

A second study was published by this group in 1966 comparing the use of CCTV alone and CCTV plus VTR (videotape recordings) in teaching clinical nursing skills. It was found that the addition of VTRs resulted in three significant changes: (1) improved students' organization and planning for care, (2) increased patient-centered comments by students during clinical conferences and (3) improved the ability of the students to report on patient care.[54]

Another study from the nursing literature having a direct relationship to this study was reported in 1964. Westley and Hornback tested the comparative effectiveness of teaching four nursing skill procedures (bedmaking, vital signs, bandaging and nasal catheter insertion) by videotape recordings and by live demonstration. The VTRs were equally effective as live demonstration and effected a considerable increase in efficiency or time saving for instructors.[55]

In another study the investigator used a self-instructional package to teach selected nursing skills. This package consisted of a linear program, an 8mm continuous loop film and a programmed laboratory exercise. A skill checklist was completed by the instructor on each student. It was discovered that "student reaction and motivation were extremely positive to the self-instructional approach."[56] Students also reported that "they preferred self-correction to teacher intervention, and . . . . that they felt more secure in their mastery of a given skill."[57]

Observational learning theory: Bandura[58] provides an excellent review and analysis of research in the field of observational learning. Of particular interest are the reports of many studies which demonstrates

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[53]Griffin, Kinsinger, Pitman, *op. cit.*, pp. 198-203.

[54]Gerald J. Griffin, Robert E. Kinsinger, Avis J. Pitman and Eunice R. Kessler, "New Dimensions for the Improvement of Clinical Nursing," *Nursing Research*, 15:292-302, Fall, 1966.

[55]Bruce H. Westley and May Hornback, "An Experimental Study of the Use of Television in Teaching Basic Nursing Skills," *Nursing Research*, 13:205-209, Summer, 1964.

[56]Roe, *op. cit.*, p. 23.

[57]*Ibid.*

[58]Albert Bandura, *Principles of Behavior Modification*, New York: Holt, Rinehart and Winston, Inc., 1969, p. 109-203.

the ability of human subjects to learn by watching the behavior of both actual and filmed models.[59]

Nursing education has depended on demonstration as a teaching modality since the earliest programs were developed. The nature of much of the instruction is the modeling by the experienced teacher of the repetoire of desirable patterns of behavior needed for practice. It is essentially an observational experience for students.

The learning process utilized in this kind of observation involves, as Bandura says, "two representational systems - an imaginal (perceptual) and a verbal one."[60] The teaching tape produced for this study was designed so that there was verbal labeling and explanation of the simultaneously visualized actions. It is easily seen that modeling behavior (or demonstration) as the instructional method is readily adapted to the utilization of media presentations as well as the direct observational ones.

The checklist used in conjunction with the critique was designed to provide a modified verbal cueing regarding proper sequence while the experimental subjects were viewing their performance tape. This was also an attempt to combine both the verbal and visual dimensions needed in the observational learning process.

Bandura assumes[61] that reproduction of the motor behavior demonstrated by the model requires the synthesis of previously acquired components into patterns. He suggests that this perceptual patterning is the basis for subsequent motor behavior performed by the subjects.

According to this same author,[62] another element which promotes efficient observational learning is reinforcement. Incentive to reproduce the modeled behavior was provided for subjects in this study by means of social approval for performance of the behavior and the payment offered only to those who completed the entire experiment.

Bandura identifies the major conditions necessary f eproduction of modeled behavior as sensory registration, transformation of events to symbolic modes of representation, motor components available to the learner and a favorable reinforcement condition.[63] This study has been designed to take all of these requirements into consideration and to provide for them by use of the demonstration videotape and differential critique conditions.

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[59] *Ibid.*, pp. 133-143.

[60] *Ibid.*, p. 133.

[61] *Ibid.*, p. 141.

[62] *Ibid.*, p. 143.

[63] *Ibid.*

This brief review of some of the relevant literature supports the research hypotheses related to the interaction of anxiety level and method of critique. The review also provides evidence that using television technology extends the capability of faculty in teaching larger numbers of students and identifies the need to test new ways to utilize television systems in schools of nursing. The relationship of the traditional demonstration teaching in schools of nursing to both the use of media and the application of observational learning theory is also discussed.

DESIGN AND METHODOLOGY

Design

The design of this study was experimental, comparing two methods of critique in teaching a psychomotor nursing skill. Table I shows the 2 x 3 x 2 factorial design employed in this study. There are two levels of treatment, three levels of anxiety and two levels of location with nesting of anxiety levels under location. Nesting of anxiety under location was necessary because subjects were not available at the same time. Cell numbers represent actual numbers of subjects on whom data were obtained.

An analysis of covariance was made using the Scholastic Aptitude Test (hereafter referred to as SAT) scores or SAT equivalents of the American College Test (hereafter referred to as ACT) scores as the covariate. The factorial design with the use of a covariate relating to ability to learn was chosen because it provides considerable power to detect actual differences in the effect of the learning treatment tested.

It was expected that response to learning (treatment) would be related to anxiety level and the Taylor Manifest Anxiety Scale was used to stratify subjects into three levels. The M.A.S. is discussed in detail in the section on Tests and Materials.

A videotape for teaching was produced and utilized to teach the skill selected for testing the two methods of critique. It is described under the section on Tests and Materials.

Videotapes were made of every subject's post-critique performance. A rating scale was devised and raters tested for reliability in its use. Scores obtained by use of the rating scale were used as the measure for learning; these scores are the measures of the dependent variable used in the analysis of covariance discussed below. Development of the rating scale is discussed under Tests and Materials.

Location and Timing

The study was carried out during the first three and one-half weeks of Fall Semester, 1971, at the University of Colorado School of Nursing

TABLE 1

FACTORIAL STUDY DESIGN

TREATMENTS	University of Colorado ANXIETY LEVEL			University of Northern Colorado ANXIETY LEVEL		
	High	Medium	Low	High	Medium	Low
EXPERIMENTAL	5	8	4	6	9	4
CONTROL	2	9	5	6	9	6

TOTAL of 73

and during the first four and one-half weeks of the Fall Quarter, 1971, at the University of Northern Colorado, Greeley, Colorado. Subjects were sought at two schools in order to assure a larger sample than would have otherwise been possible.

The experiment was carried out early in the Fall sessions in each school in order to obtain naive students as subjects (inexperienced in nursing skills) and to utilize television facilities and personnel at a period of relatively low demand in the respective schools.

Tests and Materials

Taylor Manifest Anxiety Scale: This scale, originally constructed by Janet A. Taylor, was founded on two assumptions:

> *. . . first, that variation in drive level of the individual is related to the level of internal anxiety or emotionality, and second, that the intensity of this anxiety could be ascertained by a paper and pencil test consisting of items describing what have been called overt or manifest symptoms of this state.*[64]

It consists of 50 items from the Minnesota Multiphasic Personality Inventory which were judged by psychologists to be consistent with Cameron's description of anxiety as manifested in chronic anxiety.[65]

It has been used extensively over the past two decades to differentiate subjects who are assumed to differ in motivational level. Systematic differences in performance in relation to scores have been found repeatedly.[66] This scale was therefore chosen as a valid instrument for stratifying subjects for purposes of testing the research hypotheses.

Taylor reported test-retest reliabilities over a five-month period of .82 and of .81 for periods of 9-17 months.[67] Taylor's original scale of 50 items was embedded in 175 filler items. Because it is more

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[64]Janet A. Taylor, "A Personality Scale of Manifest Anxiety," *The Journal of Abnormal and Social Psychology*, 48:285, April, 1953.

[65]Norman Cameron, *The Psychology of Behavior Disorders: A Bio-Social Interpretation* (Boston: Houghton Mifflin Co., 1947) as cited by Janet A. Taylor, *loc. cit.* and Charles D. Spielberger, "The Effects of Manifest Anxiety on the Academic Achievement of College Students," *Mental Hygiene*, 46:421, July, 1962.

[66]Charles D. Spielberger, "On the Relationship Between Manifest Anxiety and Intelligence," *Journal of Consulting Psychology*, 22:220, June, 1958.

[67]Taylor, *op. cit.*, p. 286.

parsimonious in terms of subject time and because essentially identical results are obtained between forms,[68] a form, which appears in Appendix A, consisting of only the 50 items was used.

A covariate for aptitude: Verbal and quantitative Scholastic Aptitude Test scores were obtained on all University of Colorado students. The combined total was used as the covariate. English and Math scores on the American College Test were obtained for University of Northern Colorado students. These were converted by table to SAT equivalents and then totaled for use as the covariate. (See Appendix B for conversion table.)

A covariate for past experience: Primarily in order to obtain descriptive data on the subjects, a questionnaire was administered following completion of the experimental treatment. The first page requested a narrative description of past work experience and past experience with nursing procedures (see Appendix C). Because inspection seemed to indicate that more students from the University of Northern Colorado had past experience with procedures related to the learning task, an attempt to quantify this experience was made and the results were used as a second covariate. Five persons with Master's-level preparation in nursing were asked to rank student questionnaires into three levels of past experience: (1) little or none, (2) moderate and (3) extensive. No correlations of agreement were calculated. Scores were averaged and used to rank students into five levels of past experience. This is acknowledged as an exceedingly rough estimate of past experience and was used primarily as a matter of interest on a second run of the data on the BMD 05V program.

Description of the learning task: Knowing that approximately 80 subjects would be taught the psychomotor task over a period of time, it was decided to use an audio-visual presentation in order to achieve a more nearly uniform learning situation for all subjects. Television was the obvious choice since production is less costly and time consuming than sound film. Since it has been established previously that subjects can learn long procedures quite well from audio-visual presentation,[69] the task selected was one which required sufficient number of steps and time for execution so that variance in performance could be anticipated. The procedure chosen to be learned was that of a wound dressing. Steps included setting up a sterile dressing tray, using this set-up to change the dressing on a moulage of an abdominal wound and discarding the used materials. Since these naive subjects were not expected to be familiar

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[68] Joyce B. McCreary and A.W. Bendig, "Comparison of Two Forms of the Manifest Anxiety Scale," *Journal of Consulting Psychology*, 18:206, June, 1954.

[69] Fred D. Sheffield, Garry J. Margolis and Arthur J. Hoen, "Experiments on Perceptual Mediation in the Learning of Organizable Sequences," *Student Response in Programmed Instruction*, A.A. Lumsdaine, Ed., (Washington, D.C.: National Academy of Sciences - National Research Council, 1961), pp. 196-204, as cited in Chapter II.

with maintaining a sterile field, the actual demonstration of the procedure was preceded by a brief presentation of the fundamental principles of sterile technique. Appendix D provides the script for the discussion of the principles of sterile technique and the illustrations which appeared on the tape prior to the actual demonstration. A detailed description of all the steps carried out in the procedure is provided in Appendix E. Figures 1 and 2 are photographs of the moulage and the table as it appeared before starting the procedure. Figure 3 is of the table after setting up the equipment, and Figure 4 depicts the table during changing of the dressing.

An initial videotape for teaching the procedure was produced in July, 1971, and was reviewed by two nursing faculty members and the Director of Radio and Television from the University of Northern Colorado. Recommendations for improvement included the following:

1. Use an over-the-shoulder camera to provide the actor's viewpoint.

2. Use blue smock on actor for better contrast.

3. Use colored styrofoam tray in dressing tray for better contrast.

4. Have the "nurse" in the videotape close the waste sack after removing all the dressing and cleaning the wound rather than leaving this action until last.

A rating form for evaluating videotape productions was completed by the University of Colorado viewers by two faculty members from the University of Colorado. The same University of Colorado faculty members viewed and approved the second teaching tape which contained all but one of the suggested improvements. This final videotape which was 18 minutes long was, therefore, a more effective teaching tool.

The other major tool used for the teaching task was the "Checklist for Rating Surgical Dressing of an Abdominal Wound" (see Appendix E). This list was used by graduate students to provide the teacher critique and by student subjects before and during the viewing of their videotaped performance for self-critique.

Criterion measure: After the subjects viewed the teaching tape, an initial practice period was scheduled and then critique was done. Videotape recordings were made of all subjects' second post critique performance of the procedure. These tapes were saved and scored by judges using the "Checklist for Rating . . ." in abbreviated form. These results were transferred to optical scanning sheets (see Appendix G) for simplicity in scoring. Content validity was verified by the expert judgment of the seven raters. It is also apparent in that the final rating scale contains essentially the entire universe of behavior included in the teaching tape and the critique.

Reliability of raters was established by extensive training in the use of the scale by rating a series of subject tapes made in a pilot

WOUND MOULAGE

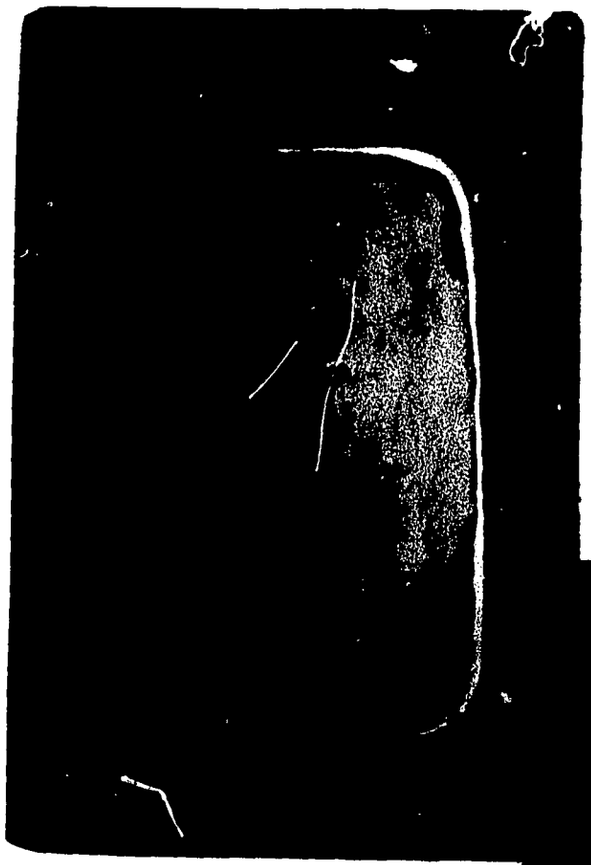

Figure 1

SET UP

BEGINNING of PROCEDURE

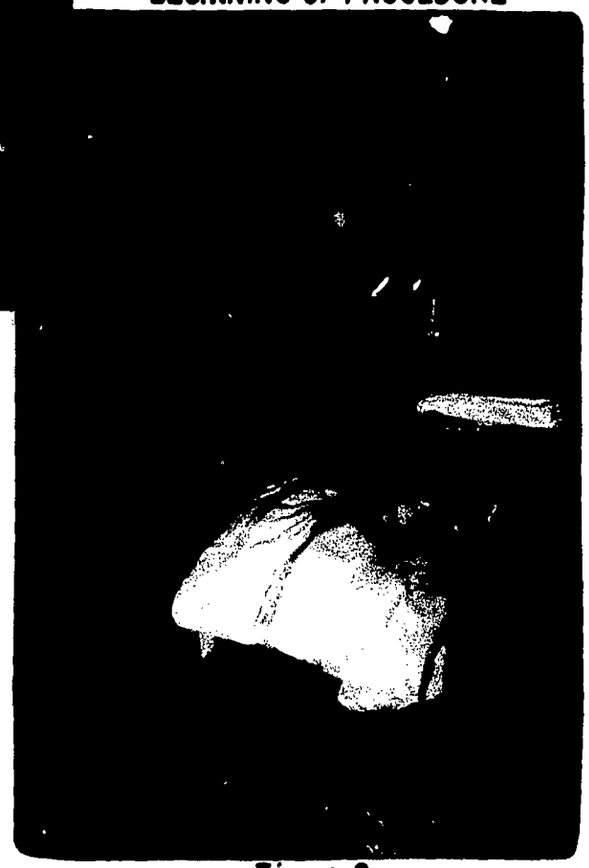

Figure 2

AFTER SETTING OF SUPPLIES

Figure 3

AFTER CLEANING WOUND

Figure 4

study prior to the actual experiment. Pearson product-moment correlations were calculated on seven raters by means of the CORREL program (Hoffmeister, TARP) which calculates the correlation on an item by item basis. Table II presents the correlation matrix for the first practice ratings. These correlations, ranging from r .118 to r .645, were judged too low and two measures were carried out to improve interrater reliability. The CORREL program provides a data matrix as part of the program printout making it a simple task to spot quite rapidly areas of disagreement between judges. The raters were assembled and the videotapes of cases one and two (and parts of three and four) were shown to the group. The raters were then asked to explain any disagreements. Ambiguous items were reworded and directions were clarified. In addition, the teaching tape was shown to all the raters. To obtain fresh cases, ratings of three of the actual experimental cases were used after training and again run through the CORREL program. Due to loss of cases as a result of technical quality of recordings, not all judges rated the same cases. An incomplete correlation matrix was the result. The rater numbered 7 in the training phase (Table II) was lost from this study so there are no correlations for rater 7 in Table III.

To make the assignment of cases to raters, the cases were listed first in the order in which they occurred on the fifteen videotapes. The cases were then assigned in groups of four in a rotation which paired each rater with each other rater with the exception that raters 6 and 7[70] shared no cases. Each tape was judged by two raters. This design, intended to reduce systematic differences due to rater differences, resulted in small numbers of paired cases available for calculation of coefficients of correlation between raters on the actual study data. Table IV presents the Pearson product-moment correlations between raters (as calculated by the BMD 03D program); the number of cases on which the calculations are based appear in parentheses. Correlations based on two or three cases provide too small a sample to rely on their stability. The low (r .215) correlation between raters 3 and 5 based on five cases was a cause for some concern. The hypothesis was tested that the product-moment correlation between raters 3 and 5 did not significantly (p .05 level) vary from a product-moment correlation of r .90 (a level which would have been very acceptable).

The statistical hypothesis tested was:

$$H_o: \; P_{3,5} = a$$

or

$$H_o: \; r\ .215 = .90$$

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[70]Rater number 7 is a new rater recruited and trained after loss of original rater number 7.

TABLE II

INTERRATER RELIABILITIES * ON FIRST RATING EXERCISE

RATER NUMBER	1	2	3	4	5	6
7	.200	.165	.141	.286	.221	.077
6	.409	.495	.409	.107	.233	
5	.238	.318	.238	.297		
4	.193	.028	.118			
3	.501	.214				
2	.287					
1						

CASES 1 AND 2

RATER NUMBER

RATER NUMBER	1	2	3	4	5	6
7	LOST DATA					
6	.606	.582	.641	.645	.61	
5	.574	.510	.627	.576		
4	.489	.446	.509			
3	.623	.547				
2	.403					
1						

CASES 3 AND 4

RATER NUMBER

* PRODUCT – MOMENT CORRELATIONS CALCULATED ON AN ITEM BASIS BY THE CORREL PROGRAM

TABLE III

INTERRATER RELIABILITIES * AFTER RATER TRAINING

RATER NUMBER	1	2	3	4	5	6
5						.796
4					.666	.623
3	.961	.981				
2	.980					
1						

RATER NUMBER

* CALCULATED ON AN ITEM BASIS BY THE CORREL PROGRAM.

TABLE IV

INTERRATER RELIABILITIES* ON STUDY DATA

RATER NUMBER	1	2	3	4	5	6
7	.579(4)	.986(4)	.99(4)	.60(4)	1.00(2)	(0)
6	.902(4)	.537(4)	.937(4)	.818(4)	.923(4)	
5	.983(3)	.000(3)	.215(5)	.729(5)		
4	.904(3)	.930(3)	.981(4)			
3	.997(3)	.000(2)				
2	.425(3)					
1						

NUMBER OF CASES USED FOR EACH CORRELATION APPEARS IN PARENTHESES

RATER NUMBER

* PRODUCT-MOMENT CORRELATIONS ON TOTAL SCORE BY BMD03D PROGRAM

by the statistical test[71]

$$Z = \frac{Z_r - Z_a}{1/n-3}$$

The Z score obtained was 1.60 or less than .10 significance in the difference. Interrater reliabilities were accepted as satisfactory for the study.

In the analysis of covariance three scores were used as measures of the dependent variable. First, a total score for the entire performance was used; it consisted of total score given by the first rater plus total score given by the second rater. Second, a "first-half" score was calculated by adding each rater's score for the first 47 items on the rating scale (see Appendix G); this first-half score represents the activities of setting up the sterile supplies. Third, a "second-half" score was obtained in the same manner, i.e., by totaling the two raters' scores on the last 67 items for each subject (see Appendix G). This "second-half" score consists of all the activities which the subject is required to do in relation to the wound moulage (or immediately following handling of the wound moulage). These two "half" scores were used in an effort to determine if anything significantly different occurred to subjects which might have been attributable to dealing with the moulage of a severe wound.

Selection and Assignment of Participants

Graduate students as teachers: Student volunteers to do the teacher critique were recruited from the graduate program at the University of Colorado School of Nursing; these students ranged in age from 25-45 and represented varied backgrounds in staff nursing, supervision and/or teaching of nursing. The assumption was made that this group of graduate students was not essentially different from teachers in schools of nursing or nursing supervisors in health care institutions. Of the 30 volunteers, 21 of the graduate students were actually available to be used as teachers. Eleven of them assisted at the University of Colorado and ten at the University of Northern Colorado. Each of the graduate students was assigned to administer four treatments. An attempt was made to schedule each student to administer two control and two experimental treatments.

Subjects: At the University of Colorado during the first weeks of Fall Semester, 1971, 63 students volunteered to participate in this investigation. The Taylor Manifest Anxiety Scale (M.A.S.) was administered and means and standard deviations were calculated from the scores achieved. The possible range of scores on the M.A.S. is 0-50. The range exhibited by this subject pool was 2-44. Students with scores

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[71]Gene V. Glass and Julian C. Stanley, *Statistical Methods in Education and Psychology* (Englewood Cliffs, N.J.: Prentice-Hall, Inc., 1970), p. 308.

above the 75th percentile (cut-off score of 20) were classified as High Anxiety; those with scores below the 25th percentile (a cut-off score of 11) were classified as Low Anxiety (see Figure 5 for distribution of M.A.S. scores).

There was a loss of 15 subjects due to the unavailability of SAT scores, absence of signed permissions required by the school or problems in scheduling. Twelve Low Anxiety subjects were available. Using a table of random numbers, six were assigned to experimental treatment (self-critique) and six to control treatment (teacher critique). There were 11 High Anxiety subjects, five assigned to control and six to experimental treatment using a table of random numbers. There were 25 Middle Level Anxiety subjects available to participate; seven were excluded using a table of random numbers (one was later included to increase the number of experimental subjects after subject loss); the remaining 18 subjects were randomly assigned, nine to each treatment condition.

A total of 39 junior level women students completed the experiment. They ranged in age from 19-30 with the mode at 20 years and the average at 21 years.

At the University of Northern Colorado, 56 students volunteered during the first week of Fall Quarter, 1971. The range of scores on the M.A.S. exhibited by this subject pool was 3-31. The 75th percentile was used to designate lower limits of the High Anxiety group (cut-off score of 19) and the 25th percentile was used as the upper limit of Low Anxiety subjects (cut-off score of 9). (See Figure 5.) Of this subject pool, six were lost because it was not possible to obtain ACT scores. Eleven subjects in the Low Anxiety group were randomly assigned to treatment groups, five experimental and six control. Twelve High Anxiety subjects were available and were randomly assigned, six to each treatment condition. Twenty-five Middle Level Anxiety subjects were available for assignment; five of these were randomly excluded and the others randomly assigned, ten to each treatment group.

A total of 40 freshman or sophomore students completed the experiment. They ranged in age from 17-19 with both the mean and the mode at 18.

Male students and persons who were graduates of vocational and technical programs in nursing were systematically excluded from the groups. Males were expected to represent too small a sample for separate statistical analyses and the literature reported a statistically significant difference between males and females on the M.A.S.

Experimental Arrangements

Graduate students: During the orientation sessions, graduate students were given a copy of the "Checklist for Rating . . ." (Appendix E) plus the printed orientation materials developed for them and for the technicians who did the videotaping. In addition, questions were

TAYLOR M.A.S. SCORES

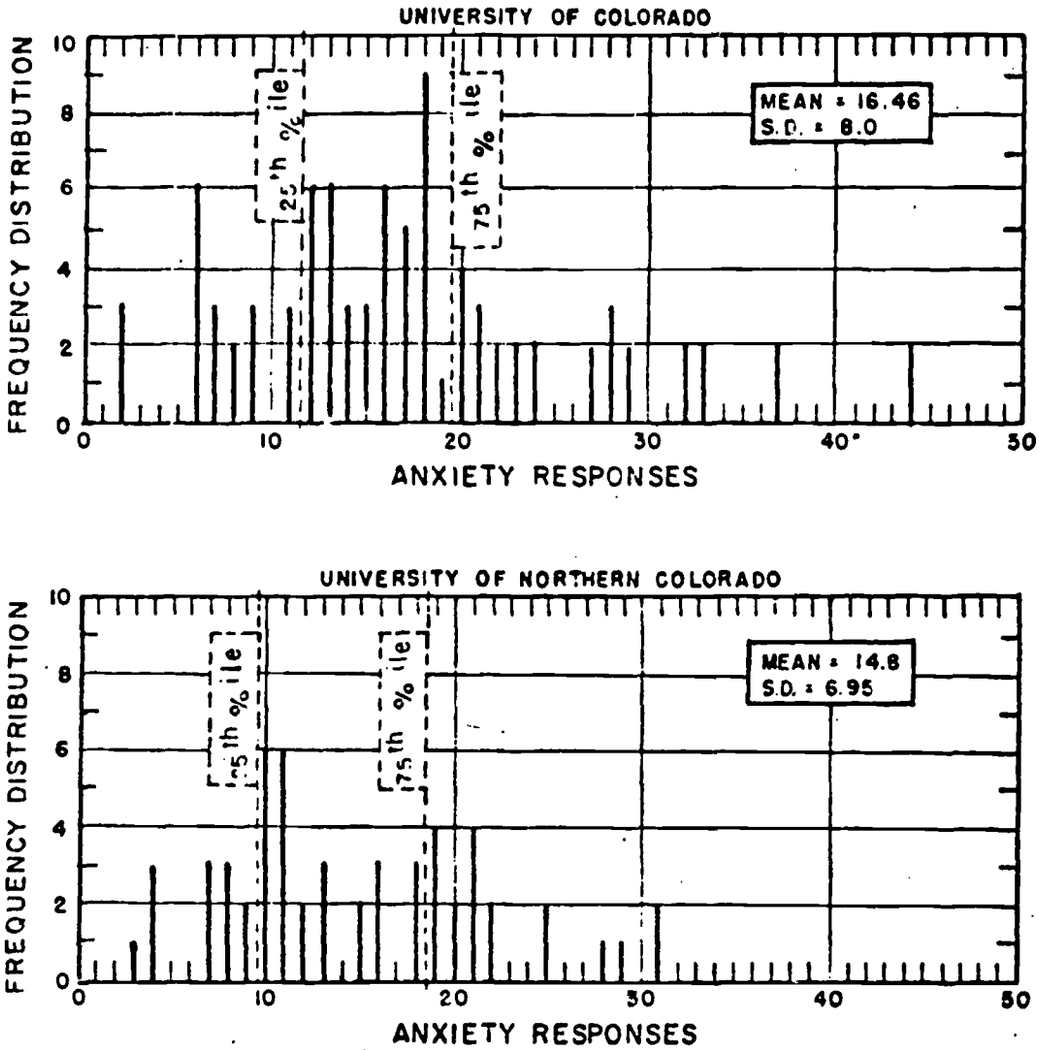

Figure 5

answered and the assistants were given suggestions about how they should act in order to standardize treatments.

TV technicians: The eight technicians (2 at the University of Colorado and 6 at the University of Northern Colorado) were given the "Checklist for Rating . . ." and the "Instructions for Graduate Assistants and Television Technicians" (Appendix F). Orientation emphasized the precise activities for which the tapes would be scored.

Viewing of teaching tape: At the University of Colorado, two subjects were shown the teaching tape at the same time. Following this showing, each was given a folder containing instructions (Appendix H), the "Checklist for Rating . . ." (face down in a back pocket) and a two-page questionnaire (Appendix C). This folder of instructions directed subjects to go to separate rooms where each received the control or experimental treatment as scheduled.

At the University of Northern Colorado, because only one practice area was available, the teaching tape was shown to one subject at a time. The subject then went to the television studio for the administration of the assigned treatment.

Experimental treatment: After seeing the teaching tape in the viewing room, experimental subjects practiced the procedure in the treatment room using exactly the same materials as were seen in the tape.[72] A TV cameraman and a graduate student were in this room during the practice. The graduate student gave the subject a blue smock and said, "Wear this, please, for contrast on the videotape." She told the student, "You may begin," after the technician had started the videorecorder. The graduate student remained in the room during this first practice but appeared occupied with other matters. Questions about performance from the student during this first practice generally could be answered with the statement, "Go on from where you are; just do the best you can." During this first practice, if an instrument broke or adhesive tape ran out, the graduate student simply handed the necessary replacement to the subject with no comment.

At the end of the first practice, the graduate assistants reminded the students to look at their instruction booklet for additional directions. The directions were to read the checklist and then to look at the videotape of their performance. Graduate assistants also suggested and enforced a ten-minute limit for student reading of the checklist before seeing the videotape.

At the University of Colorado, during the showing of the tape of the first practice, the graduate assistants set up the table with new supplies and placed on it a coded identification number. This

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[72]Two wound moulages were constructed alike; disposable dressing trays with instruments and abdominal pad (Pharmaseal catalog number 4600), gauze 4 x 4's (2 per package) and rolls of plastic tape were used for each student.

identification number was to be videotaped at the beginning of each subject's second practice. At the University of Northern Colorado, two cameras and a "mixer" allowed the identification number to be videotaped by the TV personnel.

Subjects practiced a second time immediately after seeing the tape of their first practice. This post-critique performance was saved on videotape and subsequently rated to obtain the criterion score.

Control treatment: After viewing the teaching tape, control subjects were given an instruction booklet and went to the treatment room to practice the procedure using exactly the same materials as were seen in the room during this first practice. The graduate assistant gave the student a blue smock saying, "Wear this, please, for contrast on the videotape." She told the student to begin the procedure after the technician had apparently started the videorecorder. She stood near the subject and held the checklist; she looked from the checklist to the subject, observed the performance and made notes as necessary. Questions about the procedure could usually be answered, as in the experimental treatment, with the statement, "Go on from where you are; do the best you can." If necessary, adhesive tape or an instrument was handed to the student without comment.

The technician operated the camera as though he were taping this first practice in order to equalize any possible stress reaction to being videotaped between subjects in both groups.

After the first practice, the graduate assistant compared the subject's performance with the checklist, pointed out accomplishments and omissions and made suggestions for improvement. For example, she identified breaks in sterile technique and failure to perform activities in the prescribed sequence.

After this critique, the graduate assistant put new supplies on the table as well as the coded identification number if necessary in that particular setting. Subjects practiced a second time; this post-critique practice was videotaped and subsequently rated to obtain the criterion score.

Post-treatment procedure: All subjects completed the questionnaire (Appendix C) and were instructed not to discuss their experience with classmates. In addition, the subjects received their fee and were thanked for their participation.

DATA ANALYSIS, DISCUSSION AND CONCLUSIONS

Data Analysis

Analysis of variance performed on data obtained in a manner which permits grouping of subjects into homogeneous groups provides a powerful statistical method for detecting differences between groups. The

application of a covariate provides a way in which group or cell means may be adjusted for some factor which is highly relevant to the treatment effect, and wherein it is not possible to group on the basis of that factor. The statistical procedure of analysis of covariance chosen for this experimental study provided the greatest likelihood of detecting effects of treatment, anxiety level and of school (or location) from which subjects were drawn as well as any interaction of these main effects.

Statistical hypotheses: The following statistical hypotheses were tested using analysis of covariance:

1. There was no statistically significant difference in performance between the control and experimental methods of critique (Treatments) at the .05 level of probability.

2. There was no statistically significant difference in performance between anxiety level (Anxiety Level) at the .05 level of probability.

3. There was no statistically significant difference in performance between the subject population from the University of Colorado and the subject population from the University of Northern Colorado (Location) at the .05 level of probability.

4. There was no statistically significant interaction of treatment and anxiety level at the .05 level of probability.

5. There was no statistically significant interaction of treatment and location from which subjects were drawn at the .05 level of probability.

6. There was no statistically significant three-way interaction between treatment, anxiety and location at the .05 level of probability.

Data manipulation: The scores punched on the data cards were as follows:

1. A total score which consisted of the rating given by each of two judges on the 111-item rating scale.

2. A "first half" score which consisted of the rating given by each of the two judges on only the first 47 items.

3. A "second half" score which consisted of the rating given by each of the two judges on only the last 67 items.

For the purposes of providing proportional numbers in all cells for the analysis of covariance with unequal numbers, it was necessary to

alter the numbers of observations in some cells.[73] Table V indicates the alterations in numbers of observations which were made prior to analysis. Three observations were added in the High Anxiety Control group from the University of Colorado by substituting the cell mean for each of these three observations. The cell mean was substituted for one observation in both the Medium Anxiety and the Low Anxiety Experimental Groups from the University of Colorado. The cell mean was substituted for one observation in the Low Anxiety group from the University of Northern Colorado. In addition, the following deletions were made by random elimination of one data card from each of the following groups from the University of Northern Colorado: High Anxiety Experimental, High Anxiety Control and Low Anxiety Control. Table V is a replica of the Factorial Study Design shown previously with the additional artificial means indicated in parentheses with a plus sign and the deleted cases indicated in parentheses with a minus sign. This procedure provided 76 "subjects" for the analysis of covariance; six of these were artificial, leaving 70 real subjects.

Analysis of covariance: Table VI presents the results of the Analysis of Covariance with the SAT as covariate. The total score was used as a measure of the dependent variable considered in this problem. There were no significant F values obtained in this analysis.

Table VII presents the results of the analysis of covariance when only the first 47 items from the rating scale are used as a measure of the dependent variable. None of these obtained F values approach those for the .05 level of significance.

Table VIII presents the results of the analysis of covariance when only the last 67 items of the rating (dealing with the wound moulage) are used as a measure of the dependent variable. None of these obtained F values approach significance at the .05 level; therefore, all of the statistical hypotheses (null hypotheses) were confirmed at the .05 level of confidence. The obtained value of 2.91 for location does exceed the F value for significance at the .10 level of significance for 1 and 57 degrees of freedom which is 2.799.

Statistical hypothesis number three

There was no statistically significant difference in performance between the subject population from the University of Colorado and the subject population from the University of Northern Colorado . . .

was thus confirmed at the .10 level of significance but not at the .05 level of significance.

Because the statistical procedure in use had excellent power, it was considered necessary to seek some explanation for this apparent

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[73]Numbers in cells must be proportional to allow for interpretation if non-homogeneity of variances is found to exist within cells.

TABLE V

CONFIGRATION OF DATA FOR THE ANALYSIS OF COVARIANCE

TREATMENTS	University of Colorado ANXIETY LEVEL			University of Northern Colorado ANXIETY LEVEL		
	High	Medium	Low	High	Medium	Low
EXPERIMENTAL	5	8(+1)	4(+1)	6(-1)	9	4(+1)
CONTROL	2(+3)	9	5	6(-1)	9	6(-1)

ARTIFICIAL OBSERVATIONS INDICATED BY + WITHIN PARENTHESES
DISCARDED DATA INICATED BY – WITHIN PARENTHESES

TABLE VI

ANALYSIS OF COVARIANCE WITH TOTAL SCORE ON PERFORMANCE

SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	F[3]
MAIN EFFECTS				
Treatment (A)[1]	4.54	1	4.54	0.03
Anxiety (B)[1]	81.06	2	40.53	0.36
Location (C)[1]	307.72	1	307.72	2.28
INTERACTION EFFECTS				
A x B	77.28	2	38.64	0.29
A x C	92.03	1	92.03	0.68
B x C	6.30	2	28.15	0.21
A x B x C	620.60	2	310.33	2.30
ERROR	8,482.32	63[2]	134.64	
TOTAL	9,721.85			

[1] CELL MEANS ADJUSTED FOR ONE COVARIATE: SCHOLASTIC APTITUDE

[2] FOR PURPOSES OF REFERENCING THE F TABLE, USE 57 df

[3] SIGNIFICANT F VALUES FOR .05 LEVEL

2 AND 57 df = 3.15

1 AND 57 df = 4.00

SIGNIFICANT F VALUES FOR .10 LEVEL

2 AND 57 df = 2.393

1 AND 57 df = 2.799

TABLE VII

ANALYSIS OF COVARIANCE WITH SCORE ON FIRST FORTY-SEVEN ITEMS

SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	F[3]
MAIN EFFECTS				
Treatment (A)[1]	53.92	1	53.92	2.79
Anxiety (B)[1]	75.34	2	37.67	1.94
Location (C)[1]	3.08	1	3.08	0.16
INTERACTION EFFECTS				
A x B	16.06	2	8.03	0.42
A x C	0.07	1	0.07	0.00
B x C	54.00	2	27.00	1.39
A x B x C	31.02	2	15.51	0.80
ERROR	1,217.79	63[2]	19.33	
TOTAL	1,251.28			

[1] CELL MEANS ADJUSTED FOR ONE COVARIATE: SCHOLASTIC APTITUDE

[2] FOR PURPOSES OF REFERENCING THE F TABLE, USE 57 df

[3] SIGNIFICANT F VALUES FOR .05 LEVEL
2 AND 57 df = 3.15
1 AND 57 df = 4.00
SIGNIFICANT F VALUES FOR .10 LEVEL
2 AND 57 df = 2.393
1 AND 57 df = 2.799

TABLE VIII

ANALYSIS OF COVARIANCE WITH SCORE ON LAST SIXTY-FOUR ITEMS

SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	F[3]
MAIN EFFECTS				
Treatment (A)[1]	34.55	1	34.55	0.41
Anxiety (B)[1]	10.46	2	5.23	0.06
Location (C)[1]	246.94	1	246.94	2.91[3]
INTERACTION EFFECTS				
A x B	17.86	2	58.93	0.69
A x C	75.04	1	75.04	0.88
B x C	10.74	2	5.37	0.06
A x B x C	390.84	2	195.42	2.31
ERROR	5,334.21	63[2]	84.67	
TOTAL	6,520.64			

[1] CELL MEANS ADJUSTED FOR ONE COVARIATE: SCHOLASTIC APTITUDE

[2] FOR PURPOSES OF REFERENCING THE F TABLE, USE 57 df

[3] SIGNIFICANT F VALUES FOR .05 LEVEL
2 AND 57 df = 3.15
1 AND 57 df = 4.00
SIGNIFICANT F VALUES FOR .10 LEVEL
2 AND 57 df = 2.393
1 AND 57 df = 2.799

difference in subject populations, even though the level of significance was low.

Inspection of adjusted cell means showed that subjects from the University of Northern Colorado obtained higher mean scores than those from the University of Colorado. Inspection of questionnaires completed by all subjects led to speculation that subject population differences by location (or school) might be due to greater experience with similar learning tasks by the population from the University of Northern Colorado. It was for this reason that subjects were ranked for experience and this ranking was used in a second analysis of covariance using two covariates.

Following the ranking all three problems were calculated using students' past experience as the second covariate. Inspection of Tables IX, X and XI revealed no F values of significance to indicate that differences between the two subject populations might be due to greater past experience of the University of Northern Colorado students.

Teacher effect: A random effects analysis of variance was done to test for teacher effect. The hypothesis tested was:

7. There were not statistically significant differences at the .05 level of significance in performance due to teachers.

The method used to analyze data follows. There were 22 teachers who worked with one to eight students each. The three teachers who had only one student were eliminated. For the four teachers who had only two subjects, the cell mean was added twice. For the five teachers who had three subjects, the cell mean was added once. For each of the two teachers who had eight subjects, four subjects were randomly eliminated.

Degrees of freedom for teachers were calculated at 18; degrees of freedom for subjects were calculated at 57. With the assumption that the teachers were drawn from an infinite population of teachers, a one-way random effects analysis of variance was computed. The results are displayed in Table XII.

The significance (alpha = .05) F value for 18 and 57 degrees of freedom was greater than 1.75. The obtained value of 1.23 was not significant; therefore, any difference between treatment groups would not have been attributed to teacher effect.

Student response to questionnaires: The analyses of covariance and the random effects analysis of variance were all the data analyses specifically planned; however, information was collected from subjects regarding feelings about their learning experience. Inspection of the tabulated results of the questionnaire did not suggest there was a relationship between scores and like or dislike of the method of critique experienced. Data were not subject to analysis of covariance because of many cells with only one subject.

TABLE IX

ANALYSIS OF COVARIANCE WITH TOTAL SCORE ON PERFORMANCE

SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	F[3]
MAIN EFFECTS				
Treatment (A)[1]	34.27	1	34.27	0.26
Anxiety (B)[1]	184.16	2	92.08	0.69
Location (C)[1]	175.06	1	175.06	1.32
INTERACTION EFFECTS				
A x B	100.20	2	50.10	0.38
A x C	106.47	1	106.47	0.80
B x C	41.04	2	20.52	0.15
A x B x C	461.98	2	230.99	1.74
ERROR	8,236.42	62[2]	132.84	
TOTAL	9,339.60			

[1] CELL MEANS ADJUSTED FOR TWO COVARIATES: SCHOLASTIC APTITUDE AND PREVIOUS EXPERIENCE

[2] FOR PURPOSES OF REFERENCING THE F TABLE, USE 56 df

[3] SIGNIFICANT F VALUES FOR .05 LEVEL
2 AND 56 df = 3.15
1 AND 56 df = 4.00
SIGNIFICANT F VALUES FOR .10 LEVEL
2 AND 56 df = 2.393
1 AND 56 df = 2.799

TABLE X

ANALYSIS OF COVARIANCE WITH SCORE ON FIRST FORTY-SEVEN ITEMS

SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	F[3]
MAIN EFFECTS				
Treatment (A)[1]	29.98	1	29.98	1.49
Anxiety (B)[1]	76.90	2	38.45	1.91
Location (C)[1]	2.36	1	1.18	0.06
INTERACTION EFFECTS				
A x B	6.84	2	3.42	0.17
A x C	1.56	1	1.56	0.08
B x C	37.18	2	18.59	0.92
A x B x C	26.14	2	13.07	0.65
ERROR	1,244.96	62[2]	20.08	
TOTAL	1,425.92			

[1] CELL MEANS ADJUSTED FOR TWO COVARIATES: SCHOLASTIC APTITUDE AND PREVIOUS EXPERIENCE

[2] FOR PURPOSES OF REFERENCING THE F TABLE, USE 56 df

[3] SIGNIFICANT F VALUES FOR .05 LEVEL
2 AND 56 df = 3.15
1 AND 56 df = 4.00
SIGNIFICANT F VALUES FOR .10 LEVEL
2 AND 56 df = 2.393
1 AND 56 df = 2.799

TABLE XI

ANALYSIS OF COVARIANCE WITH SCORE ON LAST SIXTY-FOUR ITEMS

SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	F[3]
MAIN EFFECTS				
Treatment (A)[1]	109.95	1	109.95	1.34
Anxiety (B)[1]	44.92	2	22.46	0.27
Location (C)[1]	117.21	1	117.21	1.42
INTERACTION EFFECTS				
A x B	113.40	2	56.70	0.69
A x C	52.62	1	52.62	0.64
B x C	13.96	2	6.98	
A x B x C	358.48	2	179.24	2.18
ERROR	5,104.46	62[2]	82.33	
TOTAL	5,915.00			

[1] CELL MEANS ADJUSTED FOR TWO COVARIATES: SCHOLASTIC APTITUDE AND PREVIOUS EXPERIENCE

[2] FOR PURPOSES OF REFERENCING THE F TABLE, USE 56 df

[3] SIGNIFICANT F VALUES FOR .05 LEVEL
2 AND 56df = 3.15
1 AND 56 df = 4.00
SIGNIFICANT F VALUES FOR .10 LEVEL
2 AND 56 df = 2.393
1 AND 56 df = 2.799

TABLE XII

RANDOM EFFECTS ANALYSIS OF VARIANCE FOR TEACHER EFFECT

SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	F[2]
TEACHERS	2628.45	18	146.02	
STUDENTS	6758.75	57[1]	118.57	1.23

[1] USE 44 FOR REFERENCING THE F TABLE

[2] SIGNIFICANT F VALUES FOR .05 LEVEL
18 AND 44 df = 2.06

Table XIII presents a partial summary of the 75 questionnaires completed by subjects following their learning experience (Appendix C). When given a choice, 35 students would have preferred teacher critique and 35 would have preferred self-critique. Most students expressed preference for the method they experience (48 out of a total of 75). In the section for comments, students had many suggestions for modification of the method used. One student observed that the last thing she saw before a second practice was her own bad example. There was one marked negative reaction to the use of self-critique as opposed to teacher observation.

The question, "Did it make you nervous to be videotaped?" was asked of experimental subjects only; 18 checked yes, 15 said no. The question, "Did it make you nervous to have the graduate student watch your first practice?" was asked of control subjects only; 31 said no, 5 said yes. In retrospect, both control and experimental subjects should have been asked both questions. As previously described, there was a graduate student in the room for each treatment, all subjects thought they were being videotaped during the initial practice and all were actually videotaped for the criterion measures. The addition of these questions might have revealed more information about stress experienced by subjects in the situation.

Discussion of Findings

In the analysis of covariance utilizing SAT score as a covariate, no significant differences were found due to treatment or anxiety. No significant interactions were found. A difference in subject populations by location (or school) was found to be significant at the .10 level of significance. A second analysis of covariance utilizing ranking on the basis of information about past experience for a second covariate subsequently eliminated even this difference.

No other differences of significance occurred on the two separate "half score" analyses which might have been apparent if there were some additional stress occurring due to reaction to the moulage of a wound (see Figure 1).

It can be said that any differences in learning by the two methods of critique are so minor that use of videotapes for self critique in laboratory situations would be a satisfactory alternative to the more traditional use of teacher critique.

Since there were no significant difference in response due to anxiety level, it is inappropriate at this time to recommend differential teaching methods based on this variable. With appropriate orientation to the use of observational learning experiences and self-critique, students could be expected to learn by these individualized methods at least as well as by the traditional ones of direct observation and teacher critique.

TABLE XIII

STUDENT OPINIONS OF THE TWO METHODS OF CRITIQUE

75 COMPLETED Q

TEACHER HELPED PREFER TEACHER	TEACHER DIDN'T HELP PREFER TEACHER	UNCERTAIN if HELPED		TEACHER HELPED PREFER VTR	TEACHER DIDN'T HELP PREFER VTR
		PREFER TEACHER	PREFER VTR		
		University of Colorado			
9	1	1	2	3	2
		University of Northern Colorado			
11	0	3	0	5	1
		Totals			
20	1	4	2	8	3

TOTAL PREFER TEACHER = 35
TOTAL TEACHER HELPED = 28

TOTAL PREFER VTR = 37
TOTAL VTR HELPED = 28

UNCERTAIN = 3
UNCERTAIN = 9 of help

VTR HELPED PREFER VTR	VTR HELPED UNCERTAIN of PREFERENCE	UNCERTAIN if HELPED		VTR HELPED PREFER TEACHER	VTR DIDN'T HELP PREFER TEACHER
		UNCERTAIN of PREFERENCE	PREFER TEACHER		
		University of Colorado			
11	1	2	1	3	1
		University of Northern Colorado			
13	0	0	1	3	1
		Totals			
24	1	2	2	6	2

The sample analyzed consisted of 70 subjects. As noted previously, power was expected to be relatively low even had there been the total of 80 subjects planned for in the beginning of the project. Because there was more than a 50/50 chance of accepting the null hypotheses even in the event that actual differences existed, there seems to be justification for discussing those obtained F values which fell between a .25 and a .10 level of significance. The analysis of covariance had considerable power and the F values above the .25 level of significance can legitimately be thought to represent possible trends worthy of discussion.

The difference between locations at a .10 level of significance appeared as a trend in other parts of the analysis. Of interest was the trend for a three-way interaction among Treatment, Anxiety and Location levels. This interaction is illustrated in Figures 6 and 7. The interaction anticipated is represented by the graph of cell means for Treatment and Anxiety levels for the University of Colorado. The three-way interaction occurred and persisted even after adding the second covariate for past experience with nursing procedures since subjects from the University of Northern Colorado exhibited the opposite interaction of Treatment and Anxiety level.

This evidence of some differences in the two subject populations other than past experience with nursing procedures is tantalizing. Factors known about differences in the two subject populations are that the University of Colorado subjects were older, had had more college experience and were believed to be from more urban home situations. Although these factors provided no substantial cues, it can be speculated that the Hull-Taylor theory of Drive actually did function at a very low level and for some reason, teacher critique was more stressful for University of Colorado subjects and that self-critique was more stressful for University of Northern Colorado subjects. In this event, the theory on Drive would be confirmed but the assumption that teacher critique was the more stressful learning condition for all subject populations would no longer be tenable.

One other possibility which may have contributed to the three-way interactions is that there were differences in intrasession history: (1) at the University of Northern Colorado the use of the studio reduced the possibility of distraction from the task itself; (2) raters noted that the quality of lighting on the University of Northern Colorado videotapes made it difficult to clearly distinguish the items to be rated; and (3) audio-visual technicians at the University of Colorado were more skillful at focusing on the specific actions to be rated.

Because interrater reliabilities were calculated on small numbers of cases it is difficult to feel completely satisfied with the ratings as a measure of the learning which occurred. If a larger number of raters had been trained and only those selected who obtained the highest measures of correlation, the reliability of the ratings might have been increased.

INTERACTION GRAPH OF
TOTAL SCORE - ONE COVARIATE

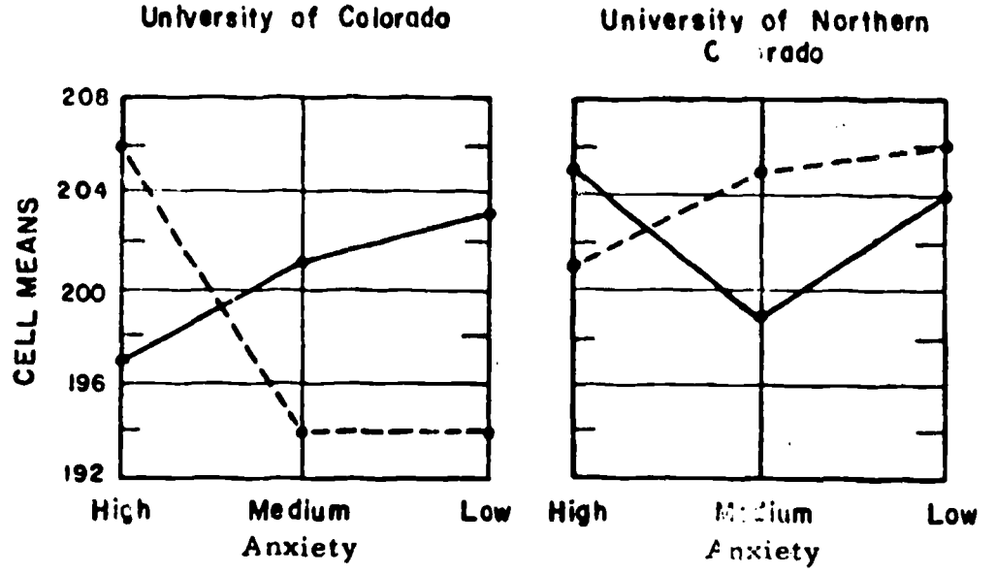

Figure 6

INTERACTION GRAPH OF
TOTAL SCORE - TWO COVARIATES

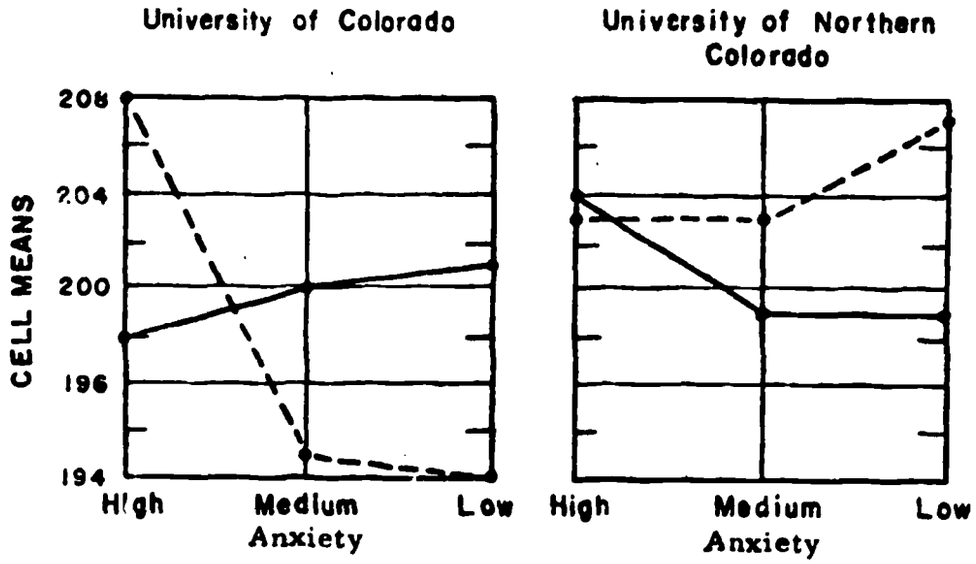

Figure 7

-----EXPERIMENTAL
——— CONTROL

This learning task was quite long and involved a number of sequential steps in prescribed order. The fact that subjects' scores ranged from 82-111 (out of a possible 111 points) indicates that a high standard of achievement was norm. That this learning resulted after a single observation and one practice session offers strong support for the position that complex sequential tasks can be learned rapidly.[74] Explicit well-planned audio-visual demonstration, careful descriptions of achievement standards and opportunity for feedback based on these standards are integral parts of this pattern of instruction. The students in this study did learn the skill with a minimum of demonstration and practice where these components were used. (See Appendix I for adjusted cell means for subject groups.)

The materials used for teaching the selected psychomotor skill are of some importance to the application of the findings of this study. The "Checklist for Rating . . ." (see Appendix E) represents a carefully specified description of the desired terminal behavior. This is in accord with the findings of Mager and Clark who report that giving specific objectives to adults facilitates very rapid learning.[75] Nursing faculty members who plan to use an auto-tutorial approach for self-instruction must recognize the necessity for detailed, carefully prepared instructional materials and descriptions of terminal behavior if similar results are to be obtained. This is a time consuming activity and it must be accepted as a part of the instructional responsibilities.

It should be noted that the self-critique condition applied in this experiment took longer than the teacher critique. This should not be taken as evidence that self-critique would necessarily take longer if students were required to use this method to learn some skill to criterion. Mager and Clark's research indicates that student learning is more efficient when sequencing and amount and kind of learning activities are under the control of the learner.[76] In order to achieve similar learning conditions in all cases in this experiment, the student did not control the sequence and number of practice periods. It would be most interesting to allow free choice of these components and observe any differences in the time required to learn the behavior specified. Another related task would be to determine the optimum level of

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[74]Fred D. Sheffield, Garry J. Margolis and Arthur J. Hoen, "Experiments on Perceptual Mediation in the Learning of Organizable Sequences," *Student Response in Programmed Instruction* (Washington, D.C.: National Academy of Sciences - National Research Council, 1961), pp. 196-204, (A.A. Lumsdaine, Ed.).

[75]Robert F. Mager and Cecil Clark, "Explorations in Student-Controlled Instruction," *Current Research on Instruction,* (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969), Anderson, Ed., pp. 54-59.

[76]*Ibid.*, p. 56.

specificity needed for behavioral descriptions of nursing procedures to be learned in a laboratory setting.

Summary of Findings

Results of the data analyses confirmed no significant differences between the two methods of critique for teaching the selected nursing skill. This result suggests that in nursing programs where videotaping is available, self-critique would be a satisfactory substitute for laboratory practice with teacher observation and critique. Differences in performance according to anxiety level were seen only as trends and, therefore, appear to have no practice significance in the selection of learning methods for individual students.

Some nursing faculty are looking forward to developing an entirely self-paced curriculum. The assurance that students can learn nursing skills with the use of faculty-developed software plus self-critique via videotape offers a viable alternative to the traditional method of faculty supervised laboratory experiences. The real test of this individualized instructional method would be more efficient learning by the student.

Conclusions

1. Subjects learned equally well from self-critique and teacher critique.

2. Anxiety level as measured by M.A.S. did not influence learning in either the self-critique or the teacher-critique conditions.

3. Learning of a complex psychomotor skill was achieved by the use of modeling (or demonstration) videotapes, limited practice sessions and feedback.

4. Feedback or critique (whether by student or teacher) was effective in promoting observational learning when it was based on detailed descriptions of the desired behavior.

5. Self-critique of videotaped performance as part of a total teaching protocol resulted in efficient learning of the psychomotor skill (surgical dressing of an abdominal wound).

Recommendations for Further Research

1. Any repetition of this research should make an attempt to select subjects from a single university in order to reduce the effect of differences between schools as a confounding variable. In addition, an increase in sample size would allow for possible loss of subjects and still provide a greater opportunity for detection of actual differences due to treatment effect at a higher level of confidence.

2. A recommendation for further research on anxiety extending from this study would be to compare the effect of anxiety level of students who perform a procedure for the first time on patients in a clinical situation with that of students who practice for the first time in a laboratory setting.

3. An additional suggestion would be to do a comparative study of the learning of several psychomotor skills to determine which skills are best thought by the self-critique instructional method utilized in this study.

4. Another study could be designed to determine the optimum time interval between laboratory practice of a psychomotor skill and the performance of that skill in the actual clinical setting.

Implications for Nursing Education

1. The results of this study suggest that faculty members in schools of nursing should be encouraged to experiment with different arrangements of the components of instructional protocols utilized to teach psychomotor skills. The particular areas recommended for experimentation are as follows:

   1.1 Development of instructional packages for the teaching of psychomotor skills which would permit self-pacing and other advantages of individualized instruction.

   1.2 Increased use of self-critique of videotaped performance as one individualized learning technique.

   1.3 Continued development of a detailed behavioral analysis for each psychomotor skill to be learned.

   1.4 Production of videotaped demonstration models of the psychomotor skills to be learned based on behavioral analysis as suggested above.

   1.5 Provision of videotaping facilities within the learning laboratory so that students have the opportunity to critique their own performance.

2. These design and development activities must be recognized as an integral part of the teacher's responsibility and the assignment of faculty must take these time-consuming tasks into consideration when loads are being calculated.

3. Any time saving which results from a decrease in the number of teacher demonstrations or amount of supervisory time required should be used to offer students a greater amount of individualized instruction; such methods of individualized instruction might include the diagnosis of specific learning problems, the

development of optional extended or expanded sequences for rapid learners and the provision of more substantial assistance to high risk learners.

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APPENDICES

APPENDIX A

TAYLOR MANIFEST ANXIETY SCALE

PERSONALITY INVENTORY

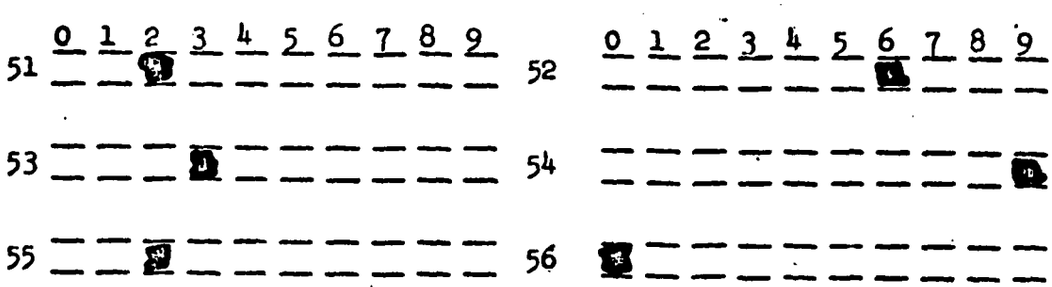
Instructions: Respond True or False to the statements in this Inventory. Please be as frank as you can be. Your answers will be held in strict confidence by the investigator and will be used ONLY for her research purpose.

Mark your answers on the IBM answer sheet:

0 for True 1 for False

Please note that the question numbers go from left to right, not top to bottom. Mark your intended response between the dotted lines heavy and dark. Mark only ONE answer per question. Make no stray marks of any kind on the answer sheet. Keep the answer sheet clean. If you erase, do so completely. Do not fold or tear the answer sheet.

There are 50 questions. Use the numbers 51 through 56 to indicate your own matriculation number, i.e., in the following example, the matriculation number so indicated is 263920.



1. I do not tire quickly.

2. I am troubled by attacks of nausea.

3. I believe I am no more nervous than most others.

4. I have very few headaches.

5. I work under a great deal of tension.

6. I cannot keep my mind on one thing.

7. I worry over money and business.

8. I frequently notice my hand shakes when I try to do something.

9. I blush no more often than others.

10. I have diarrhea once a month or more.

11. I worry quite a bit over possible misfortunes.

12. I practically never blush.

13. I am often afraid that I am going to blush.

14. I have nightmares every few nights.

15. My hands and feet are usually warm enough.

16. I sweat very easily even on cool days.

17. Sometimes when embarrassed, I break out in a sweat which annoys me greatly.

18. I hardly ever notice my heart pounding and I am seldom short of breath.

19. I feel hungry almost all the time.

20. I am very seldom troubled by constipation.

21. I have a great deal of stomach trouble.

22. I have had periods in which I lost sleep over worry.

23. My sleep is fitful and disturbed.

24. I dream frequently about things that are best kept to myself.

25. I am easily embarrassed.

26. I am more sensitive than most other people.

27. I frequently find myself worrying about something.

28. I wish I could be as happy as others seem to be.

29. I am usually calm and not easily upset.

30. I cry easily.

31. I feel anxiety about something or someone almost all the time.

32. I am happy most of the time.

33. It makes me nervous to have to wait.

34. I have periods of such great restlessness that I cannot sit long in a chair.

35. Sometimes I become so excited that I find it hard to get to sleep.

36. I have sometimes felt that difficulties were piling up so high that I could not overcome them.

37. I must admit that I have at times been worried beyond reason over something that really did not matter.

38. I have very few fears compared to my friends.

39. I have been afraid of things or people that I know could not hurt me.

40. I certainly feel useless at times.

41. I find it hard to keep my mind on a task or job.

42. I am unusually self-conscious.

43. I am inclined to take things hard.

44. I am a high-strung person.

45. Life is a strain for me much of the time.

46. At times I think I am nc good at all.

47. I am certainly lacking in self-confidence.

48. I sometimes feel that I am about to go to pieces.

49. I shrink from facing a crisis or difficulty.

50. I am entirely self-confident.

APPENDIX B

CONVERSION TABLE - ACT TO SAT

ACT-SAT CONVERSION TABLE

UNIVERSITY OF COLORADO 1969*

ACT-English	=	SAT-Verbal	ACT-Math	=	SAT-Quantitative
1-5		231	1		238
6		240	2		248
7		251	3		257
8		264	4		267
9		276	5		277
10		287	6		285
11		300	7		296
12		315	8		305
13		327	9		315
14		338	10		325
15		345	11		334
16		356	12		342
17		377	13		376
18		393	14		386
19		431	15		405
20		460	16		415
21		483	17		428
22		504	18		456
23		527	19		464
24		566	20		474
25		589	21		495
26		618	22		508
27		656	23		527
28		671	24		544
29		711	25		562
30		726	26		578
31		740	27		609
32		753	28		627
33		766	29		642
34		779	30		655
35		800	31		675
36		800	32		713
			33		738
			34		747
			35		781
			36		800

*This conversion table was developed by Dr. Robert Whetstone, University Examiner in the Center for Student Life Programs and Studies, University of Colorado.

APPENDIX C

SUBJECT QUESTIONNAIRE

Experimental Subject

UNIVERSITY OF COLORADO SCHOOL OF NURSING
MEDICAL CENTER
Denver, Colorado

Questionnaire for Research Project

Name_____Age_____

Matriculation Number_____Handedness (right or left)_____

Previous Work Experience of Last Five Years (Full or Part Time)

_____

_____

_____

_____

_____

_____

Previous Experience with Nursing Procedures (list kinds performed, how frequently)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Please check the appropriate space below. Did it make you nervous to be video-taped?

Yes_____ No_____ Uncertain_____

Did the checklist and the video-tape of yourself help you perform better the second time?

Yes_____ No_____ Uncertain_____

Which do you think you would prefer: This method of learning about your performance or a teacher's help?

Teacher's help _____

Checklist and video-tape of self _____

Other Comments:

Control Subject
UNIVERSITY OF COLORADO SCHOOL OF NURSING
MEDICAL CENTER
Denver, Colorado

Questionnaire for Research Project

Name_____ Age_____

Matriculation Number_____ Handedness (right or left)_____

Previous Work Experience of Last Five Years (Full or Part Time)

_____

_____

_____

_____

_____

_____

Previous Experience with Nursing Procedures (list kinds performed, how frequently)

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Please check the appropriate space below. Add any comments you like in response to the questions:

Did it make you nervous to have the graduate student watch your first practice?

Yes_____ No_____ Uncertain_____

Did the checklist and graduate student help you perform better the second time?

Yes_____ No_____ Uncertain_____

Which do you think you would prefer: This method of learning to improve your performance or using the check list while looking at a video-tape of what you did during the first practice?

Teacher's help_____

Just checklist and see myself on video-tape_____

Other Comments:

APPENDIX D

SCRIPT FOR PRINCIPLES OF STERILE TECHNIQUE

AS GIVEN ON TEACHING TAPE

Sterile Dressing of an Abdominal Wound

To learn procedure you are about to see, you should understand the terms:

Sterile and Sterile Technique

Sterile means free of all living organisms and spores.

Sterile technique means the method of handling, manipulating or using equipment and supplies so that no organisms come in contact with

(a) sterile supplies and/or

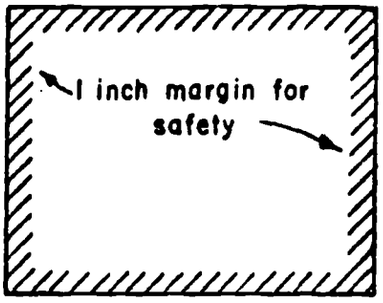
(b) damaged tissues

First, I will list a few general rules for maintaining sterile technique and then demonstrate these in the dressing procedure.

Rules

1. Everything which touches a wound must be sterile.
2. Hands doing a dressing must be clean and dry.
3. All work surfaces must be clean and dry. Liquids draw organisms in through linen or paper by capillary action.
4. Wrappers on sterile supplies are sterile on the inside and can be used as a sterile work surface.
5. Allow a one-inch margin for safety when using sterile wrappers to make your sterile "field" or work surface.

Wrapper



6. Minimum air movement as caused by talking, coughing or flopping linens or dirty dressings about is vital to reduce germs falling on sterile areas.
7. Once you set up a sterile field, work over it as little as possible, i.e., don't open other packages while holding them directly over the sterile field.

Learning Cues

In this demonstration observe for

Sterile method

done in

correct order or sequence

This clay model is a moulage of an abdominal wound. These are (1) retention sutures and (2) a penrose drain.

(The moulage was shown, then the camera moved to the demonstration of the procedure. The actor explained her activities throughout the demonstration.)

APPENDIX E

CHECK LIST FOR RATING SURGICAL DRESSING

OF AN ABDOMINAL WOUND

CHECK LIST FOR RATING

SURGICAL DRESSING OF AN ABDOMINAL WOUND

_____ 1. Remove plastic wrapper from dressing tray and drop the plastic wrapper into the wastebasket.

_____ 2. Place white plast. bag and twistem to one side.

OPENING STERILE TRAY

OPEN FIRST 3 CORNERS

_____ 3. Place tray so that the first corner of the wrapper points toward the person doing the procedure.

_____ 4. Open corner of tray wrapper from front to back (i.e., away from self).

_____ 5. Open side corner, _____

_____ 6. without reaching across the tray, _____

_____ 7. and without touching the contents of the tray. _____

_____ 8. Open second side corner,

_____ 9. without reaching across the tray

_____ 10. and without touching the contents of the tra,.

OPEN 4TH CORNER

_____ 11. Remove forceps from fold of 4th corner by grasping handle, lifting straight up.

_____ 12. Fingers must not touch the inside of the wrapper or its contents. _____

_____ 13. The forceps ends must not touch anything unsterile. _____

_____ 14. Open 4th corner toward self _____

_____ 15. without touching contents of tray, and while

_____ 16. holding forceps so that the and used for handling supplies remains sterile from center to tip.

ARRANGE INSTRUMENTS & DRESSINGS

_____ 17. Use the forceps to move envelope of instruments

_____ 18. to side of styrofoam tray.

_____ 19. Keep the envelope away from the edge of wrapper (must stay within one inch of wrapper edge) _____

_____ 20. Avoid contaminating envelope in anyway (as by having it accidentally touch your hands). _____ _____

_____ 21. Use forceps to move dressings onto sterile wrapper

_____ 22. immediately behind the styrofoam tray.

_____ 23. Avoid contaminating by touching.

_____ 24. Place forceps on sterile wrapper so sterile portion from center to tips is within the 1" border of the wrapper

Score when it occurs - May occur somewhere else

SET UP SOLUTION CUP

_____ 25. Using forceps, set up solution cup _____

_____ 26. without contaminating forceps _____

_____ 27. or tray contents. _____

SET UP APPLICATORS

_____ 28. Using forceps set up cotton tipped applicator

_____ 29. without contaminating. _____

_____ 30. Set up second applicator _____

_____ 31. without contaminating. _____

_____ 32. Set up third applicator

_____ 33. without contaminating.

POUR SOLUTION

_____ 34. Pick up solution bottle with hand

_____ 35.

_____ 36.

_____ 37. Remove cap of bottle without touching lip of bottle.

POUR SOLUTION

_____ 38. Pour solution into solution cup
_____ 39. without contaminating tray and _____
_____ 40. without dripping solution. _____
_____ 41. Close solution bottle _____
_____ 42. and set to one side on table.

OPEN EXTRA DRESSING

_____ 43. Open extra dressings by peeling back wrappers
_____ 44. without touching inside.
_____ 45. Pick up forceps and place extra dressings on dressing stack _____
_____ 46. without contaminating forceps and _____
_____ 47. without contaminating dressings. _____
_____ 48. Drop paper dressing wrapper into wastebasket.

END OF SET UP

Loosen tape on dressing and stick to

REMOVE OUTER DRESSING

_____ 1. itself on top of dressing.
_____ 2. Pick up the white plastic waste bag _____
_____ 3. and invert over one hand. _____
_____ 4. Pick up outer dressings from wound _____
_____ 5. with hand covered with plastic waste bag.
_____ 6. Turn plastic waste bag right side out over dirty dressings.
_____ 7. Do this away from wound and sterile field and
_____ 8. without allowing dirty dressings to touch hands.
_____ 9. Set plastic waste bag to one side where it will not touch wound or dressing tray
_____ 10. and is convenient to put waste materials into.

REMOVE INNER DRESSING

_____ 11. Pick up forceps again. Use these forceps to remove dirty dressings and

_____ 12. drop dirty dressings into waste bag.

_____ 13. Remove dressing from around drain without

_____ 14. pulling drain out.

_____ 15. Remove packing from wound (first piece)

_____ 16. Remove packing from wound (second piece)

_____ 17. Put dirty forceps into waste bag with last dressing.

CLEAN WOUND

_____ 18. Pick up cotton tipped applicator and dip into solution cup

_____ 19. without contaminating sterile field and

_____ 20. without allowing solution to drip on sterile field.

_____ 21. Clean down one side of wound

_____ 22. with rotating motion.

_____ 23. Drop dirty applicator into waste bag.

Repeat steps 18-23 for other side of wound.

_____ 24. (pick up)

_____ 25. (don't drip)

_____ 26. (clean down other side)

_____ 27. (with rotating motion)

_____ 28. (drop in waste bag)

_____ 29. (pick up)

_____ 30. (don't drip)

_____ 31. (clean around)

_____ 32. (with rotating motion)

_____ 33. (drop into waste bag)

USING INSTRUMENTS

_____ 34. Pick up envelope of instruments and

_____ 35. slide instruments out over lip of envelope before touching.

USING INSTRUMENTS

_____ 36. Touching only the handle of an instrument, remove from envelope. _____

_____ 37. Remove second instrument without contaminating. _____

_____ 38. Using the scissors and forceps, pick up one 4 x 4 dressing.

PACK WOUND

_____ 39. Open 4 x 4 only part way

_____ 40. without contaminating. _____

_____ 41. Use scissors to hold and forceps to pack 4 x 4 dressing into wound. _____

_____ 42. Pick up 2nd 4 x 4 dressing

_____ 43. without contaminating.

_____ 44. Pack into wound without contaminating.

DRESS DRAIN

_____ 45. Pick up 4 x 4 - keep sterile. _____

_____ 46. Cut from middle of one side to center of 4 x 4 - keep sterile. _____

_____ 47. Place slit of 4 x 4 around drain site. _____

DRESS WOUND

_____ 48. Place 4 x 4's over drain site and

_____ 49. along top of wound. _____

_____ 50. Repeat three to five times as necessary. _____

_____ 51. Do not shift a dressing once it is put in place. _____

_____ 52. Pick up ABD pad at center of fold.

_____ 53. Using hands so fingers do not touch edges, open and place over wound.

_____ 54. Tape crosswise of wound.

CLEAN UP

_____ 55. Put used supplies into tray and cover. _____

_____ 56. Close waste bag with minimum motion. _____

_____ 57. Drop waste bag into trash. _____

APPENDIX F

INSTRUCTION SHEETS USED TO ORIENT GRADUATE ASSISTANTS AND TELEVISION TECHNICIANS

INSTRUCTIONS FOR GRADUATE RESEARCH ASSISTANTS

The purpose of this study is to elicit information which could give some indication of differences which may occur in learning a psychomotor nursing skill under two different methods of providing corrective feedback or critique.

I am using the experimental method with appropriate statistical analysis of data (Analysis of Covariance) to compare two methods of critique which are as follow:

The Control treatment consists of critique of a psychomotor performance by a nurse instructor using a standardized check list between the student's two practices.

The Experimental treatment consists of critique by allowing the student to read the standardized check list first and then see a videotape of her first practice between two practices.

Every possible effort will be made to see that every other aspect of the student's experiences are essentially the same. The purpose is to eliminate all other sources of systematic difference. This allows us to make such probability statements as -- if there is a difference in performance between the two groups, 95 chances out of 100, it is due to the difference in treatment.

Subjects are beginning level nursing students. The skill to be learned is surgical dressing of a moulage of an abdominal wound. Teaching will be done by a videotape. Supplies are a disposable surgical dressing tray (same as in teaching tape). Graduate students recruited to administer treatments are considered representative of nursing instructors and supervisors students ordinarily encounter. Twenty graduate students will administer 4 treatments each, two control and two experimental. Analysis of Variance will be used to check for teacher effect as one uncontrolled source of systematic difference.

The treatments are planned as follows:

First: Two students will view the teaching tape at a time. Each student will then go to a room set up with camera and equipment for practicing what she has seen. The graduate students will hand the instruction booklets to the assigned students, go with the students, and unobtrusively act as escorts to see that students go directly to the assigned rooms and begin the practice as soon as is practical.

Second: The graduate student will act to see that the instructions in the booklet are followed (by reminding students to read and follow). She may also expedite the treatment by seeing that camera men know when to begin taping or showing the videotape to students.

Third: The graduate student will take up booklets and questionnaires. They will also explain briefly to students that it is necessary not to discuss any details of the experiment with classmates until it is over so that all subjects come equally unprepared.

Verbal instructions which should be given are as follows:

1. Before showing of the videotape

   a. You are to see a videotape of a nursing procedure
   b. Read the first page of the instruction booklet you will be given
   c. Go to the room indicated to practice the procedure two times.
   d. After the videotape begins, you are not to discuss its contents with each other.

2. After tape, hand out booklets

   Read the instructions carefully and try to follow these as you would with any standardized test.

3. In the room, give smock to student

   Here is a navy blue smock. Please wear this for purposes of improving contrast on the videotape.

INSTRUCTIONS FOR
TV PERSONNEL

1. Students on experimental directions will have blue folders and an I.D. number beginning with 1.

   a. Tape first practice.

   b. Show student the videotape after student has read the procedure check list.

   c. Show only one time.

   d. Tape second practice over first practice.

   e. Have grad student hold card with Student's I.D. number for taping before starting second practice.

2. Students on control directions will have Red folders and an I.D. number beginning with 2.

   a. Pretend to tape first practice.

   b. Videotape I.D. number

   c. Videotape and save second practice.

3. Important points:

   a. Avoid all possible waiting time for subjects: (1) between seeing teaching tape and doing first practice; (2) between reading check list and seeing tape of first practice; (3) between critique and second practice.

      In other words - keep it moving.

   b. Read procedure check list so you know what to tape.

GOOD LUCK!

APPENDIX G

OF SCAN RATING SCALE USED BY RATERS

AND DIRECTIONS FOR USE

STANDARD ANSWER SHEET

IDENTIFICATION NUMBER				
LOCATION NUMBER		0		4
MISCELLANEOUS CODES	SEX	M1	M2	
	M3	M4	M5	

Use only a #2 pencil to mark your responses.

Mark only one response for each question.

Erase completely any response you wish to change.

Score 1 if not done

Score 2 if done

Student I.D. in Location number
Judge I.D. in M-1
Page No. in M-2

1. *Set plastic bag and	1	2	3	4	5	21. MOVE DRESSINGS TO BACK OF STYROFOAM TRAY	1	2	3	4	5
2. *Twistem to one side	1	2	3	4	5	22. Using forceps	1	2	3	4	5
3. OPEN FIRST THREE CORNERS OF TRAY WRAPPER	1	2	3	4	5	23. [illegible] contaminating forceps,	1	2	3	4	
4 *Place tray so first unopened corner point. toward actor.	1	2	3	4	5	24. Drassings or,	1	2	3	4	5
5 Open corner away from self.	1	2	3	4	5	25. Tray contents and,	1	2	3	4	5
6 *Open side corner	1	2	3	4	5	26. *Keep drassings stacked in order	1	2	3	4	5
7. Without reaching across tray	1	2	3	4	5	27. SET UP OTHER TRAY CONTENTS	1	2	3	4	5
8 And without touching contents of the tray	1	2	3	4	5	28. *Set up sol. cup	1	2	3	4	5
9. *Open 2nd side corner	1	2	3	4	5	29. Avoid contaminating tray or contents	1	2	3	4	5
10. Without reaching across tray	1	2	3	4	5	30. Avoid contaminating forceps	1	2	3	4	5
11. Without touching contents of the tray	1	2	3	4	5	31. *Set up applicators (No. 1)	1	2	3	4	5
12. OPEN FOURTH CORNER	1	2	3	4	5	32. Using forceps	1	2	3	4	5
13. *Remove forceps from 4th corner fold	1	2	3	4	5	33. Don't contaminate	1	2	3	4	5
14. Without contaminating forceps.	1	2	3	4	5	34. *Set up applicator (No. 2)	1	2	3	4	5
15. Without contaminating tray contents	1	2	3	4	5	35. Using forceps	1	2	3	4	5
16 MOVE INSTRUMENTS TO SIDE OF STYROFOAM TRAY	1	2	3	4	5	36. Don't contaminate	1	2	3	4	5
17. Using forceps to move.	1	2	3	4	5	37. *Set up applicator (No. 3)	1	2	3	4	5
18. Keep envelope within sterile field (1" margin)	1	2	3	4	5	38. Using forceps	1	2	3	4	5
19 Avoid contamination of forceps.	1	2	3	4	5	39. Don't contaminate	1	2	3	4	5
20 Or any tray contents	1	2	3	4	5	40. POUR SOLUTION	1	2	3	4	5

Form SAS 1

STANDARD ANSWER SHEET

IDENTIFICATION NUMBER			
LOCATION NUMBER	1	0	4
MISCELLANEOUS CODES	SEX	M1	M2
	M3	M4	M5

Use only a #2 pencil to mark your responses

Mark only one response for each question

Erase completely any response you wish to change

Score 1 if not done

Scor 2 if done

Student I.D. in Location number
Judge I.D. in M-1
Page No. in M-2

1. Don't contaminate sol.	1 2 3 4 5	21. Placing all into plastic sack	1 2 3 4 5
2 Don't contaminate tray.	1 2 3 4 5	22. *Put set-up forceps into sack with last dressing	1 2 3 4 5
3 OPEN EXTRA DRESSINGS	1 2 3 4 5	23. Don't contaminate anything with them	1 2 3 4 5
4 *Transfer to dressing stack	1 2 3 4 5	24. CLEAN WOUND	1 2 3 4 5
5 Don't contaminate forceps	1 2 3 4 5	25. *Pick up 1st applicator and moisten	1 2 3 4 5
6 Don't contaminate dressings	1 2 3 4 5	26. Without contaminating	1 2 3 4 5
7. Keep set up forceps from sterile when put on sterile field	1 2 3 4 5	27. *Clean down one side	1 2 3 4 5
8 REMOVE DRESSING	1 2 3 4 5	28. Don't go over site more than once	1 2 3 4 5
9. *Loosen tape on dressing	1 2 3 4 5	29. Use rotating motion (one direction)	1 2 3 4 5
10 Stick to self on top of dressing	1 2 3 4 5	30. Discard in waste sack.	1 2 3 4 5
11. *Invert waste bag over one hand	1 2 3 4 5	31. *Pick up 2nd applicator and moisten	1 2 3 4 5
12. *Use bagged hand to remove outer dressings	1 2 3 4 5	32. Without contaminating	1 2 3 4 5
13. Avoid contaminating wound	1 2 3 4 5	33. *Clean down other side	1 2 3 4 5
14. *Turn plastic bag back over dressings	1 2 3 4 5	34. Don't go over site more than once	1 2 3 4 5
15 Away from sterile field	1 2 3 4 5	35. Use rotating motion (one direction)	1 2 3 4 5
16. Without contaminating hands	1 2 3 4 5	36. Discard in waste sack	1 2 3 4 5
17. *Set bag to one side	1 2 3 4 5	37. *Pick up 3rd applicator and moisten	1 2 3 4 5
18. *Use set-up forceps to	1 2 3 4 5	38. Without contaminating	1 2 3 4 5
19. *Remove inner dressings	1 2 3 4 5	39. Clean around drain	1 2 3 4 5
20 Without contaminating work area	1 2 3 4 5	40. Don't go over site more than once	1 2 3 4 5

Form SAS 1

STANDARD ANSWER SHEET

IDENTIFICATION NUMBER

LOCATION NUMBER 10 4

MISCELLANEOUS CODES SEX M1 M2 M3 M4 M5

Use only a #2 pencil to mark your responses.

Mark only one response for each question.

Erase completely any response you wish to change.

Score 1 if not done

Score 2 if done

Student I.D. in Location number
Judge I.D. in M-2
Page No. in M-2

1.	Use rotating motion (one direction)	21	And over wound		
2.	Discard in waste sack	22.	Don't contaminate		
3	TAKE INSTRUMENTS FROM ENVELOPE	23.	PUT ABD OVER DRESSING		
4	Don't contaminate trey	24.	Pick up with hands		
5	Don't contaminate scissors	25.	Don't contaminate ABD		
6	Don't contaminate forceps	26.	Don't contaminate wound dressing		
7.	Place instruments on tray	27.	TAPE DRESSING IN PLACE		
8	PACK WOUND	28.	*Put used supplies on tray		
9.	Using sterile scissors and forceps	29.	CLOSE WASTE SACK		
10	Push into wound with forceps	30.	Use Minimum motion		
11.	Don't contaminate 1st 4 x 4	31.	Discard into trash can		
12.	Don't contaminate 2nd 4 x 4	32.			
13.	Don't contaminate instruments	33.			
14.	DRESS DRAIN	34.			
15.	*Cut slit into 4 x 4	35.			
16.	*Put around drain	36.			
17.	Don't contaminate instruments	37.			
18.	Don't contaminate 4 x 4	38.			
19.	*DRESS WOUND	39.			
20.	Place 4 x 4 over drain	40.			

Form SAS-1

DIRECTIONS FOR USING RATING SCALE

I. Items which are in CAPITAL LETTERS are sequence items. They are to be scored 2 if they are done after the previously listed items in CAPS with no intervening item in CAPS. If the item is not done in sequence, score 1.

II. Items which are asterisked,*, are action items - score 2 if they occur (do not score technique in these items). Score 1 if they are omitted.

III. Technique items are not asterisked or capitalized. Score 2 if technique is correct. Score 1 if technique is violated.

IV. The best strategy for scoring is to see the case through and score sequence items first. Do not score other items at this time.

There is no way you can score behaviors which do not occur on the scale. They must be ignored.

If some action (either asterisked or CAPS) is ommitted altogether, score 1 on all the applicable technique items also.

Please code in Stu I.D. No. in spaces labeled Location no., as per example of first case, on all 3 pages.

APPENDIX H

INSTRUCTIONS TO SUBJECTS FROM BOOKLET

USED IN ADMINISTERING TREATMENTS

Control Subject

INSTRUCTION

You have just seen the videotape, "Sterile Dressing of an Abdominal Wound." Please read and follow carefully the following directions. Directions are given in this form so that each person receives the same instructions.

1. Go to room number _____.
2. There you will find the necessary equipment and supplies to practice the skill you have just seen.
3. A nurse graduate student and a T-V technician will be in the room. The T-V technician will tape your practices. These tapes will be saved for rating by judges as part of the procedure for evaluating the teaching tape you just saw.
4. The nurse graduate student is there to help you learn by going over a procedure check list with you and by telling you how you can improve.
5. She will also replace the supplies so you can practice a second time.
6. You may take a moment to locate and identify the equipment. PLEASE DO NOT HANDLE IT UNTIL YOU ARE READY TO BEGIN.
7. Be sure you are ready to begin so that stopping and beginning over is avoided.
8. Tell the technician when you are ready to start so that he can tape your practice.

DO NOT TURN THE PAGE UNTIL YOU HAVE COMPLETED BOTH PRACTICES.

Experimental Subject

INSTRUCTIONS

You have just seen the video-tape, "Sterile Dressing of an Abdominal Wound." Please read and follow carefully the following directions. Directions are given in this form so that each person receives the same instructions.

1. Go to room number _____.
2. There you will find the necessary equipment and supplies to practice the skill you have just seen.
3. A technician is there with a T-V camera to tape your first practice so you may see it.
4. A nurse graduate student will be in the room also. Neither of these persons can give you assistance with learning the surgical dressing procedure.
5. You may take a moment to locate and identify the equipment. PLEASE DO NOT HANDLE IT UNTIL YOU ARE READY TO BEGIN.
6. Be sure you are ready to begin so that stopping and beginning over is avoided.
7. Tell the technician when you are ready to start so that he can tape your practice.
8. DO NOT TURN THE PAGE UNTIL YOU HAVE COMPLETED YOUR PRACTICE. Read Page 2 before viewing the tape of your practice.

Experimental Subject

PAGE 2

To better help you learn this procedure, carry out the following steps.

READ THROUGH ALL THE DIRECTIONS BEFORE YOU BEGIN TO FOLLOW THEM.

FIRST — Read the procedure checklist in the back pocket of this folder (take about 5 minutes).

SECOND — Look at the videotape of your first practice to see how you can improve.

THIRD — After you have read the checklist and evaluated your actions on the videotape, repeat the practice again.

There is a questionnaire in the pocket for you to complete when you finish. Give the booklet back to the graduate student when you are done.

THANK YOU FOR YOUR HELP!

APPENDIX I

DISPLAY OF ADJUSTED CELL MEANS

WITH ONE AND TWO COVARIATES

ADJUSTED CELL MEANS

ONE COVARIATE

University of Colorado

Experimental		Control	
High Anxiety	206.1	High Anxiety	197.3
Medium Anxiety	193.5	Medium Anxiety	201.5
Low Anxiety	194.0	Low Anxiety	203.3

University of Northern Colorado

Experimental		Control	
High Anxiety	201.3	High Anxiety	205.0
Medium Anxiety	205.5	Medium Anxiety	199.7
Low Anxiety	206.3	Low Anxiety	203.0

ADJUSTED CELL MEANS

TWO COVARIATE

University of Colorado

Experimental		Control	
High Anxiety	208.1	High Anxiety	198.3
Medium Anxiety	195.2	Medium Anxiety	200.9
Low Anxiety	194.5	Low Anxiety	201.8

University of Northern Colorado

Experimental		Control	
High Anxiety	203.9	High Anxiety	204.3
Medium Anxiety	203.7	Medium Anxiety	199.7
Low Anxiety	207.3	Low Anxiety	199.0